Airwell

Service Manual

PNX DCI Series

Indoor Units	Outdoor Units
PNX 9 DCI	GC 9 DCI
PNX 12 DCI	GC 12 DCI
PNX 18 DCI	GC 18 DCI
PNX 21 DCI	GC 21 DCI
PNX 24 DCI	GC 24 Z DCI

REFRIGERANT

R410A

HEAT PUMP

SM PNXDCI 1-A.1 GB

NOVEMBER – 2008

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1. INTRODUCTION

1.1 General

The new **PNX DCI INVERTER** split wall mounted range has expanded, comprising the following RC (heat pump) models:

- **ST PNX 9**
- **ST PNX 12**
- **ST PNX 18**
- **ST PNX 21**
- **ST PNX 24**

The indoor **PNX DCI** units are available as LED display types, featuring esthetic design, compact dimensions, and low noise operation.

1.2 Main Features

The **PNX DCI** series benefits from the most advanced technological innovations, namely:

- DC inverter technology.
- R410A.
- High COP.
- Lego concept.
- Pre-Charged units up to the max' allowing tubing distance.
- Networking system connectivity.
- A dry contact for clock or power shedding functions (configurable).
- Base heater connection.
- Cooling operation at outdoor temperature down to -10°C.
- Heating operation at outdoor temperature down to -15°C.
- Supports Indoor Air Quality features, such as – Ionizer and Active Electrostatic Filter.
- Indoor large diameter cross flow fan, allowing low noise level operation.
- Bended indoor coil with treated aluminum fins and coating for improved efficiency.
- Easy access to the interconnecting tubing and wiring connections, so that removing the front grill or casing is not necessary.
- Refrigerant pipes can be connected to the indoor unit from 5 different optional directions.
- Water condensate tray is equipped with two optional drain connections
- Automatic treated air sweep.
- Low indoor and outdoor noise levels.
- Easy installation and service.

1.3 Indoor Unit

The indoor unit is wall mounted, and can be easily fitted to many types of residential and commercials applications.
New design is available in LED version.

Indoor Unit features:

Feature	PNX 9	PNX 12	PNX 18	PNX 21	PNX 24
Display	LED				
Ionizer	Optional				
ESF	Optional				
Fresh air	Optional				
Indoor fan motor	Variable speed (PG)				
Horizontal motorized louver	YES				
Vertical motorized louver	Optional				
Heating element	NO				
M2L Cable port	YES				
Dry contact	Presence detector or (jumper selected) power shedding				

1.4 Filtration

The **PNX DCI INV** series presents several types of air filters:

- Easily accessible, and re-usable pre-filters (mesh)
- Pre-charged electrostatic filter (disposable)
- Active carbon filter (disposable)
- ESF. Active Electro Static re-usable filter (optional)

1.5 Ionizer (Optional)

A special design Ionizer protected by unique patents integrated into the indoor unit, generating negative ions to the room providing comfort and upgraded indoor air quality.

1.6 Control

The microprocessor indoor controller, and an infrared remote control, supplied as standard, provides complete operating function and programming.
Remote controllers: RC-2/3/4/5/7, RC-4i-1, RCW, µBMS.
Networking system Airconet version 4.2 and up, MIU SW version H8 and up.
For further details please refer to the Operational Manual.

1.7 Outdoor Unit

The **PNX DCI INV** outdoor units can be installed as floor or wall mounted units by using a wall supporting bracket. The metal sheets are protected from corrosion paint work allowing long life resistance. All outdoor units are pre-charged. For further information please refer to the Product Data Sheet, Chapter 2.

Outdoor Unit Feature

Feature	GC 9 DCI	GC 12 DCI	GC 18 DCI	GC 21 DCI	GC 24Z DCI
Display	3 LED's				
Base Heater	Optional				
Outdoor Fan	Variable speed DC Inverter				

1.8 Tubing Connections

Flare type interconnecting tubing to be produced on site.
For further details please refer to the Installation Manual.

1.9 Accessories

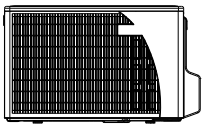
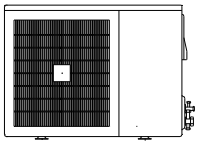
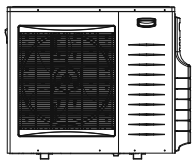
Item	Description
MIU (LEX)	MODBUS interface unit
RS485 Adapter	To be used as an interface with RCW or µBMS remote controllers
Base Heater	
M2L cable Port	

1.10 Inbox Documentation

Each unit is supplied with its own installation and operation manuals.

1.11 Matching Table

1.11.1 R410A

OUTDOOR UNITS			INDOOR UNITS				
	MODEL	REFR"	PNX 9	PNX 12	PNX 18	PNX 21	PNX 24
	GC 9 DCI	R410A	√				
	GC 12 DCI	R410A		√			
	GC 18 DCI	R410A			√		
	GC 21 DCI	R410A				√	
	GC 24Z DCI	R410A					√

2. PRODUCT DATA SHEET

2.1 PNX 9 DCI

Model Indoor Unit				**PNX 9 DCI**	
Model Outdoor Unit				**GC 9 DCI R410A**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	8530(4780-12280)	11600(5120-17060)
			kW	2.5(1.4-3.6)	3.4(1.5-5.0)
Power input (1)			kW	0.595(0.42-1.0)	0.81(0.39-1.6)
EER (Cooling) or COP(Heating) (1)			W/W	4.20	4.20
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50	
Rated current			A	2.7	3.8
Power factor				0.97	0.97
Prated (IDU)			W	32	
Prated (IDU+ODU)			W	1600	
Starting current			A	10.5	
Circuit breaker rating			A	15	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1050/900/800	
	Air flow (2)	H/M/L	m3/hr	530/430/330	
	External static pressure	Min	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	51/ - /39	
	Sound pressure level (4)	H/M/L	dB(A)	39/ - /26	
	Moisture removal		l/hr	1	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	810x285x210	
	Net Weight		kg	11.5	
	Package dimensions	WxHxD	mm	870x356x282	
	Packaged weight		kg	14	
	Units per pallet		units	28	
	Stacking height		units	7 levels	
OUTDOOR	Refrigerant control			Electronical Expansion Valve	
	Compressor type,model			Single Rotary DC Inverter,Panasonic 5RS102XAB	
	Fan type & quantity			Propeller x 1	
	Fan speeds	H	RPM	830	
	Air flow	H	m3/hr	1780	
	Sound power level	H	dB(A)	61	
	Sound pressure level (4)	H	dB(A)	51	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38	
	Package dimensions	WxHxD	mm	970x650x394	
	Packaged weight		kg	42	
	Units per pallet		Units	9	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.1	
	Additional charge			No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	3/8"(9.53)	
		Max.tubing length	m.	Max.20	
		Max.height difference	m.	Max.10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.2 PNX 12 DCI

Model Indoor Unit				**PNX 12 DCI**	
Model Outdoor Unit				**GC 12 DCI R410A**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	11940(4780-14670)	14670(5100-19790)
			kW	3.5(1.4-4.3)	4.3(1.5-5.8)
Power input (1)			kW	0.99(0.42-1.25)	1.125(0.39-1.75)
EER (Cooling) or COP (Heating) (1)			W/W	3.54	3.82
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50	
Rated current			A	4.6	5.2
Power factor				0.97	0.97
Prated (IDU)			W	40	
Prated (IDU+ODU)			W	1800	
Starting current			A	10.5	
Circuit breaker rating			A	15	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1100/950/800	
	Air flow (2)	H/M/L	m3/hr	550/450/350	
	External static pressure	Min	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	52/ - /39	
	Sound pressure level (4)	H/M/L	dB(A)	40/ - /26	
	Moisture removal		l/hr	1.5	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	810x285x210	
	Net Weight		kg	11.5	
	Package dimensions	WxHxD	mm	870x356x282	
	Packaged weight		kg	14	
	Units per pallet		units	28	
	Stacking height		units	7 levels	
OUTDOOR	Refrigerant control			Electronical Expansion Valve	
	Compressor type,model			Single Rotary DC Inverter,Panasonic 5RS102XAB	
	Fan type & quantity			Propeller x 1	
	Fan speeds	H	RPM	830	
	Air flow	H	m3/hr	1780	
	Sound power level	H	dB(A)	62	
	Sound pressure level (4)	H	dB(A)	52	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38.5	
	Package dimensions	WxHxD	mm	970x650x394	
	Packaged weight		kg	42.5	
	Units per pallet		Units	9	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.2	
	Additional charge		g/m	No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	3/8"(9.53)	
		Max.tubing length	m.	Max.20	
		Max.height difference	m.	Max.10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.3 PNX 18 DCI

Model Indoor Unit				**PNX 18 DCI**	
Model Outdoor Unit				**GC 18 DCI R410A**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	17060(5120-20470)	20470(5120-25930)
			kW	5.00(1.50-6.00)	6.00(1.50-7.60)
Power input (1)			kW	1.46(0.50-2.00)	1.66(0.45-2.20)
EER (Cooling) or COP(Heating) (1)			W/W	3.42	3.61
Energy efficiency class				A	A
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	6.6	7.5
Starting current			A	10.5	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1200/1050/900	
	Air flow (2)	H/M/L	m3/hr	850/760/620	
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	55/51/47	
	Sound pressure level(4)	H/M/L	dB(A)	43/39/34	
	Moisture removal		l/hr	2	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1060x295x210	
	Weight		kg	15	
	Package dimensions	WxHxD	mm	1125x360x280	
	Packaged weight		kg	18	
	Units per pallet		units	16 units per pallet	
	Stacking height		units	8 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Scroll,Panasonic 5CS130XCC03	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	920	
	Air flow	H/L	m3/hr	2160	
	Sound power level	H/L	dB(A)	63	
	Sound pressure level(4)	H/L	dB(A)	53	
	Dimensions	WxHxD	mm	795x610x290	
	Weight		kg	39	
	Package dimensions	WxHxD	mm	945x655x395	
	Packaged weight		kg	43	
	Units per pallet		Units	9 units per pallet	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	1.50/7.5	
	Additional charge per 1 meter		g/m	No need	
	Connections between units	Liquid line	In.(mm)	1/4”(6.35)	
		Suction line	In.(mm)	1/2”(12.7)	
		Max.tubing length	m.	Max.30	
		Max.height difference	m.	Max. 10	
Operation control type				Remote control	
Heating elements			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.4 PNX 21 DCI

Model Indoor Unit				**PNX 21 DCI**	
Model Outdoor Unit				**GC 21 DCI R410A**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	20470(5120-22860)	22180(5120-26950)
			kW	6.00(1.50-6.70)	6.50(1.80-7.90)
Power input (1)			kW	1.99(0.50-2.20)	1.90(0.45-2.30)
EER (Cooling) or COP(Heating) (1)			W/W	3.02	3.42
Energy efficiency class				B	B
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	8.9	8.6
Starting current			A	10.5	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1250/1100/1000	
	Air flow (2)	H/M/L	m3/hr	900/760/620	
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	56/53/48	
	Sound pressure level(4)	H/M/L	dB(A)	45/40/34	
	Moisture removal		l/hr	2	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1060x295x210	
	Weight		kg	15	
	Package dimensions	WxHxD	mm	1125x360x280	
	Packaged weight		kg	18	
	Units per pallet		units	16 units per pallet	
	Stacking height		units	8 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Scroll,Panasonic 5CS130XCC03	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	820	
	Air flow	H/L	m3/hr	2860	
	Sound power level	H/L	dB(A)	65	
	Sound pressure level(4)	H/L	dB(A)	55	
	Dimensions	WxHxD	mm	846x690x302	
	Weight		kg	46	
	Package dimensions	WxHxD	mm	990x770x430	
	Packaged weight		kg	50	
	Units per pallet		Units	9 units per pallet	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	1.65/7.5	
	Additional charge per 1 meter		g/m	No need	
	Connections between units	Liquid line	In.(mm)	1/4”(6.35)	
		Suction line	In.(mm)	1/2”(12.7)	
		Max.tubing length	m.	Max.30	
		Max.height difference	m.	Max. 10	
Operation control type				Remote control	
Heating elements			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.5 PNX 24 DCI

Model Indoor Unit				**PNX 24 DCI**	
Model Outdoor Unit				**GC 24 Z DCI R410A**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	23188(5100~25575)	25916(5100~30000)
			kW	6.8(1.5-7.5)	7.6(1.5~8.8)
Power input (1)			kW	2.25(0.5-2.8)	2.35(0.45~3.0)
EER (Cooling) or COP(Heating) (1)			W/W	3.01	3.23
Energy efficiency class				B	C
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	9.8	10.3
Starting current			A	15	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1300/1150/1000	1350/1200/1050
	Air flow (2)	H/M/L	m3/hr	950/800/650	1000/850/700
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	60/54/47	
	Sound pressure level (4)	H/M/L	dB(A)	47/41/34	
	Moisture removal		l/hr	2.5	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1060x295x210	
	Weight		kg	15	
	Package dimensions	WxHxD	mm	1115x350x260	
	Packaged weight		kg	18	
	Units per pallet		units	16	
	Stacking height		units	8 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Two Rotary,Mitsubishi TNB220F	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	850	
	Air flow	H/L	m3/hr	3600	
	Sound power level	H/L	dB(A)	66	
	Sound pressure level (4)	H/L	dB(A)	56	
	Dimensions	WxHxD	mm	950x835x412	
	Weight		kg	65.5	
	Package dimensions	WxHxD	mm	1080x910x477	
	Packaged weight		kg	73	
	Units per pallet		Units	2	
	Stacking height		units	2 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	2.4kg/30m	
	Additional charge per 1 meter		g/m	No Need	
	Connections between units	Liquid line	In.(mm)	3/8"(9.53)	
		Suction line	In.(mm)	5/8"(15.88)	
		Max.tubing length	m.	Max.30	
		Max.height difference	m.	Max.15	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

3. RATING CONDITIONS

Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units).

Cooling:
Indoor: 27°C DB 19°C WB
Outdoor: 35 °C DB

Heating:
Indoor: 20°C DB
Outdoor: 7°C DB 6°C WB

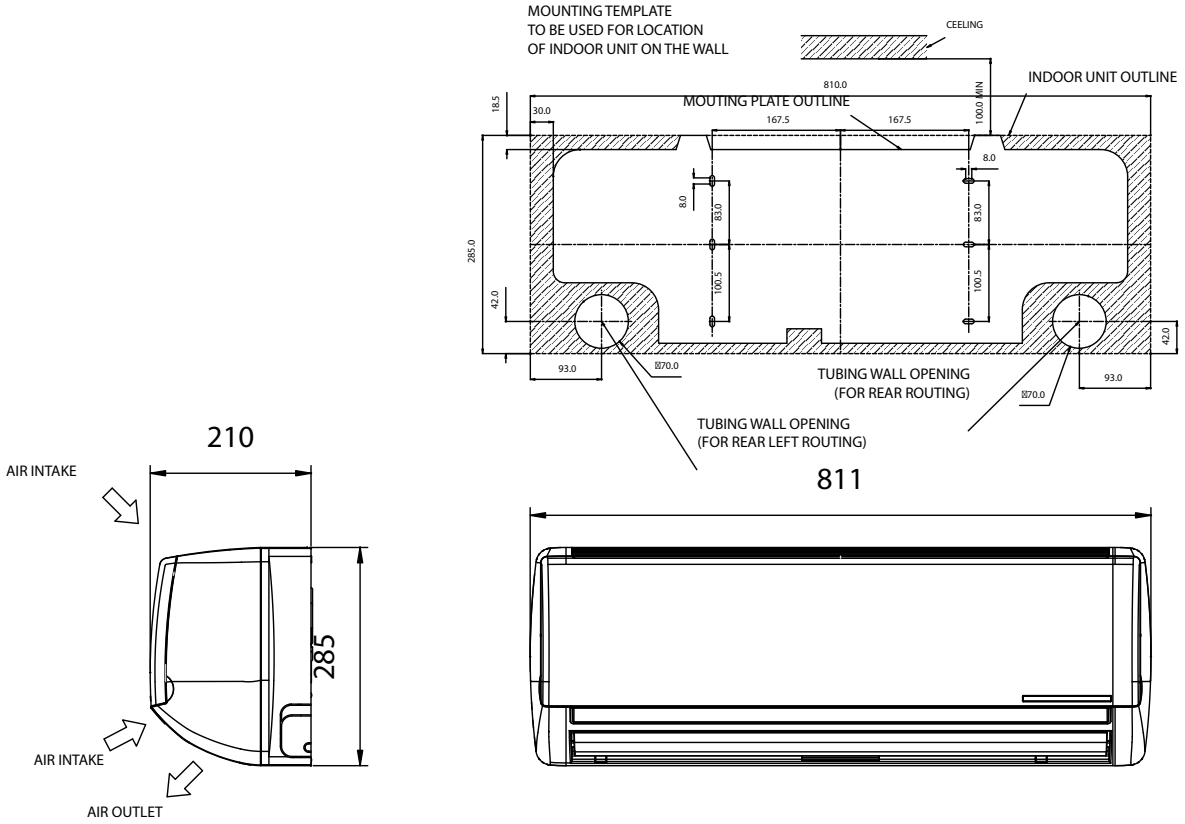
3.1 Operating Limits

3.1.1 R410A

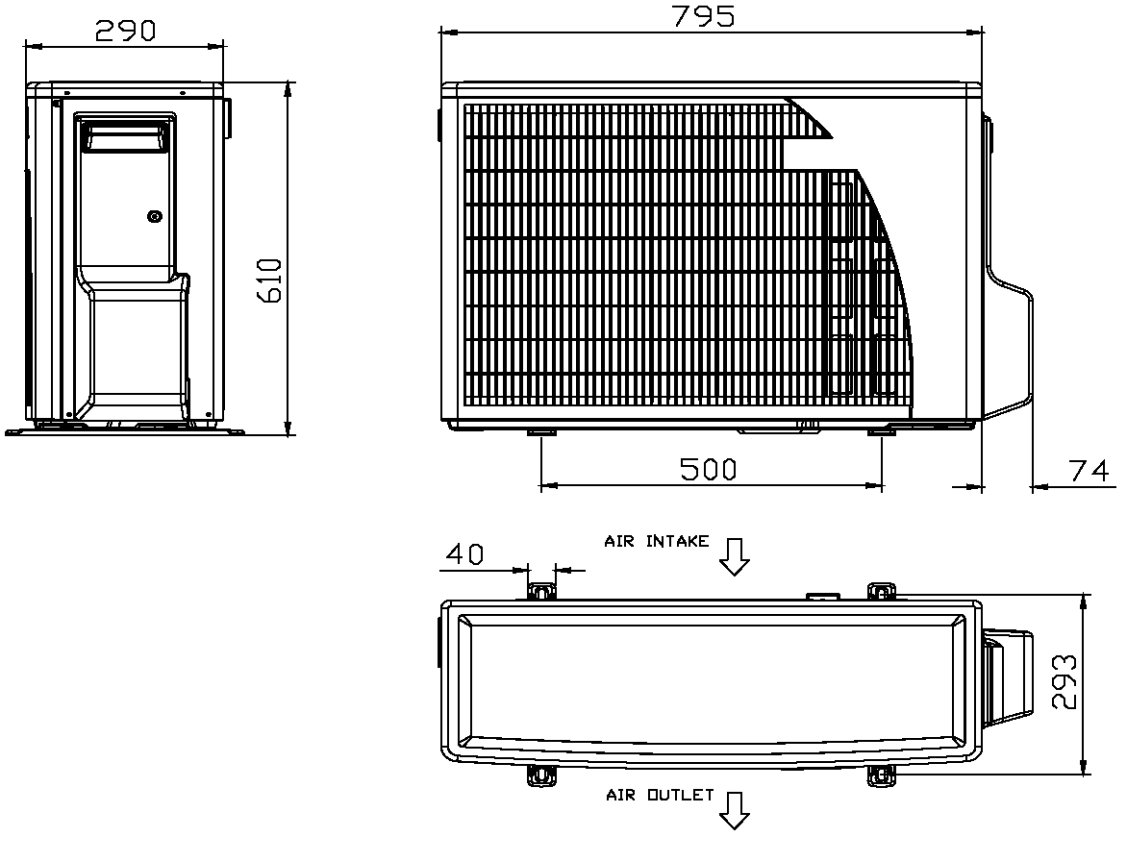
		Indoor	Outdoor
Cooling	**Upper limit**	32°C DB 23°C WB	46°C DB
	Lower limit	21°C DB 15°C WB	-10°C DB
Heating	**Upper limit**	27°C DB	24°C DB 18°C WB
	Lower limit	10°C DB	-15°C DB -16°C WB
Voltage		198 – 264 V	

4. OUTLINE DIMENSIONS

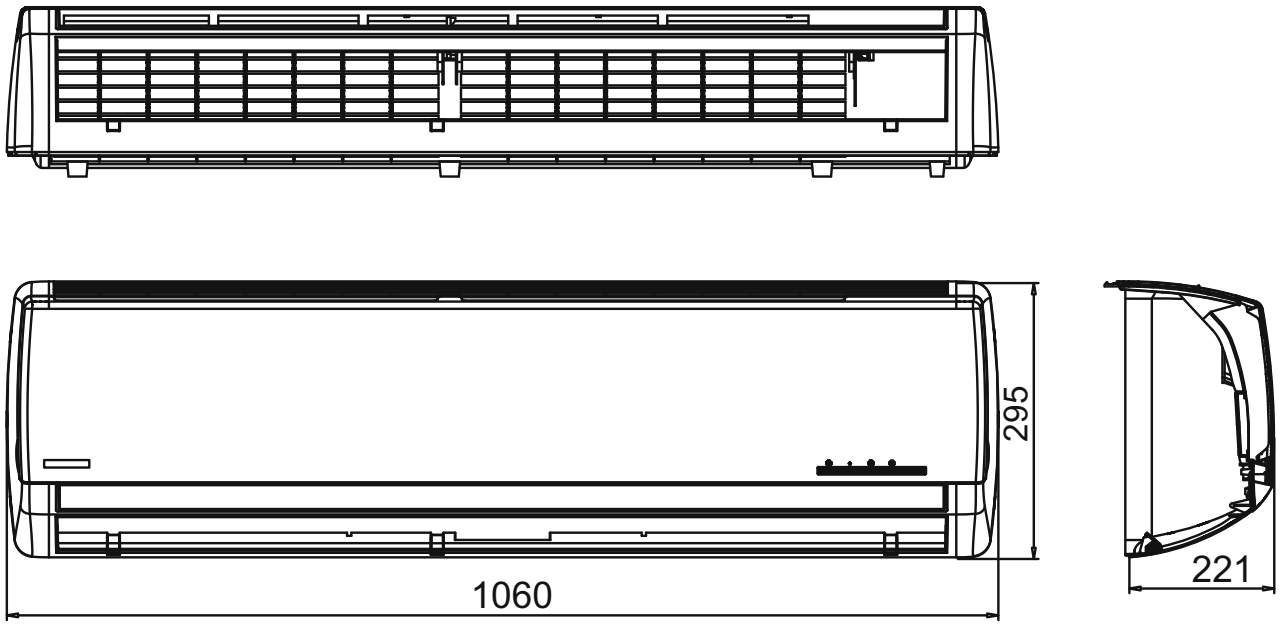
4.1 Indoor Unit: PNX 9 / 12 DCI



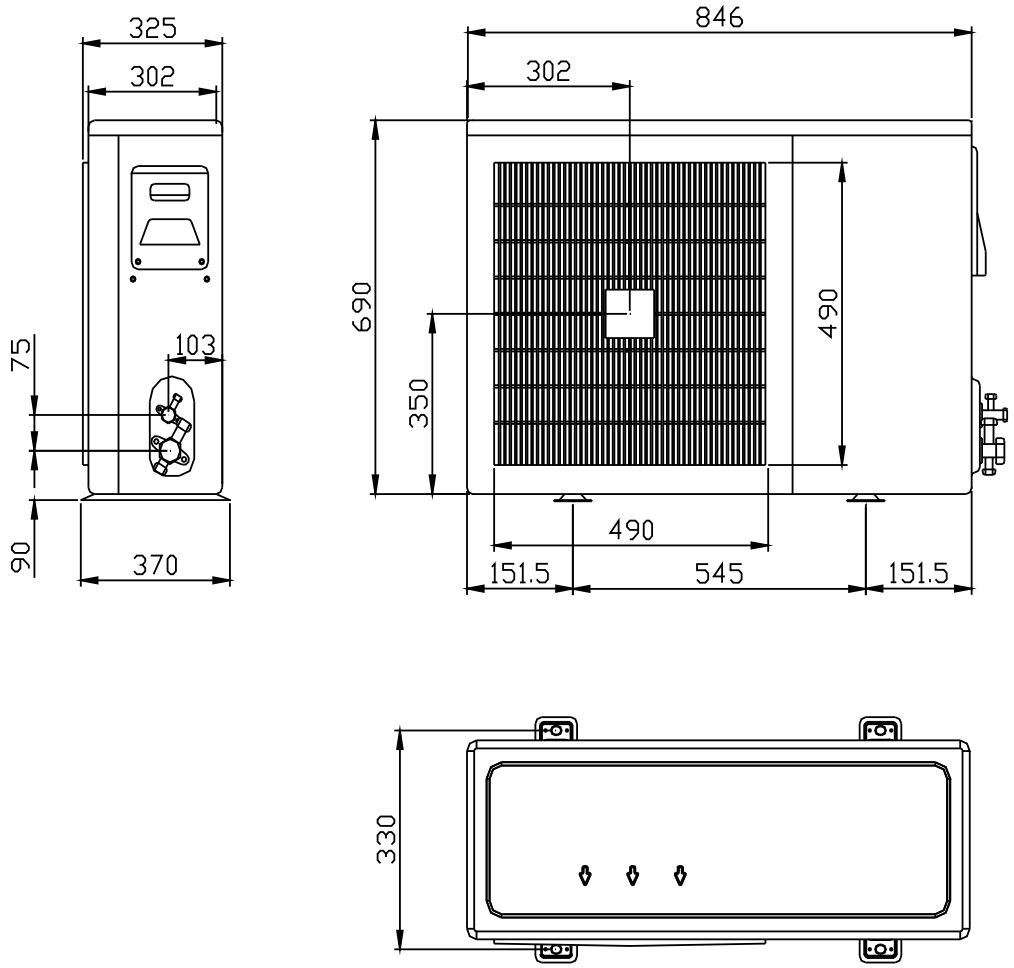
4.2 Outdoor Unit: GC 9 / 12 / 18



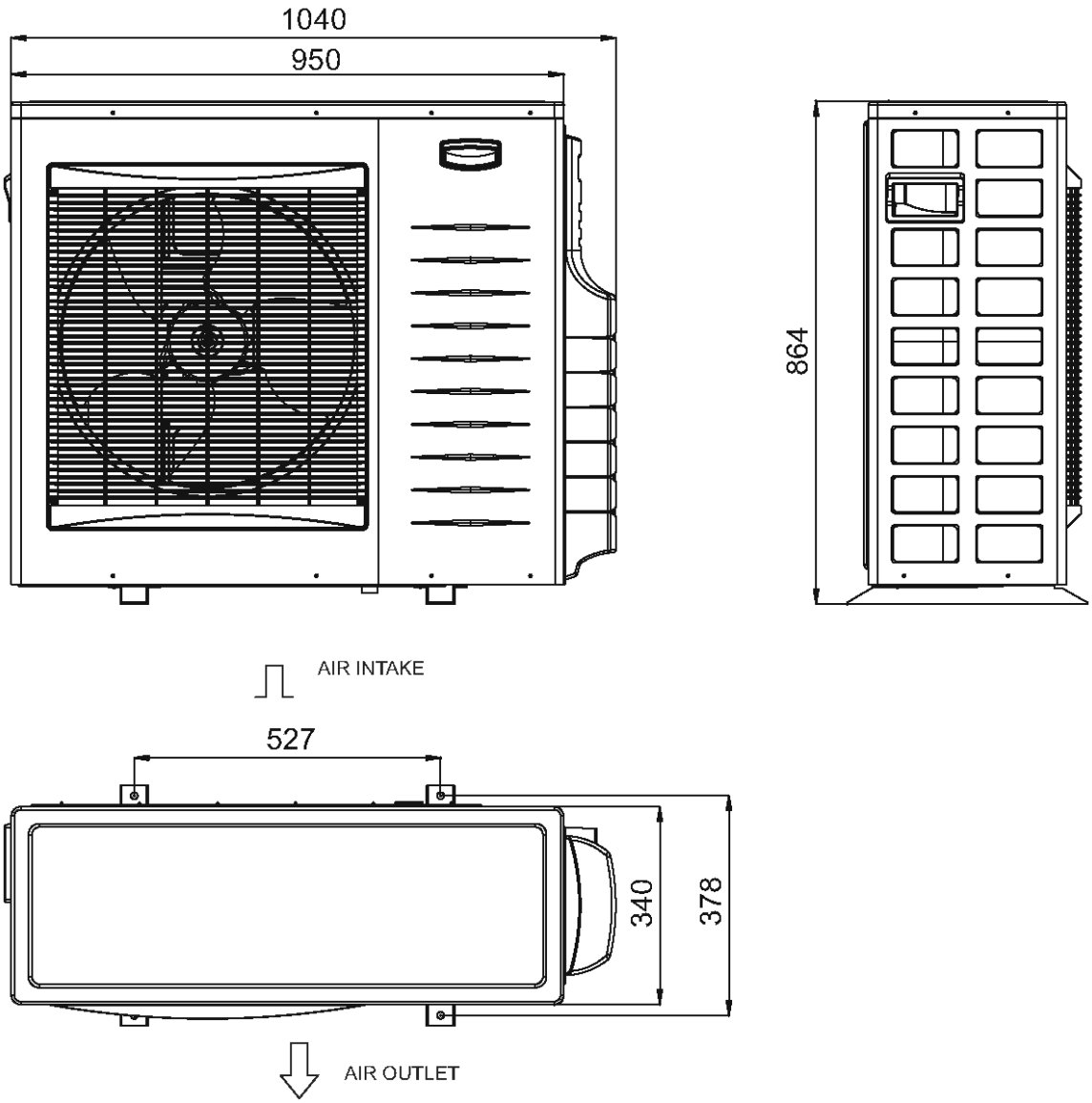
4.3 Indoor Unit: PNX 18 / 21 / 24



4.4 Outdoor Unit: GC 21 DCI



4.5 Outdoor Unit: GC 24 Z DCI



5. PERFORMANCE DATA

5.1 PNX 9 / GC 9 DCI

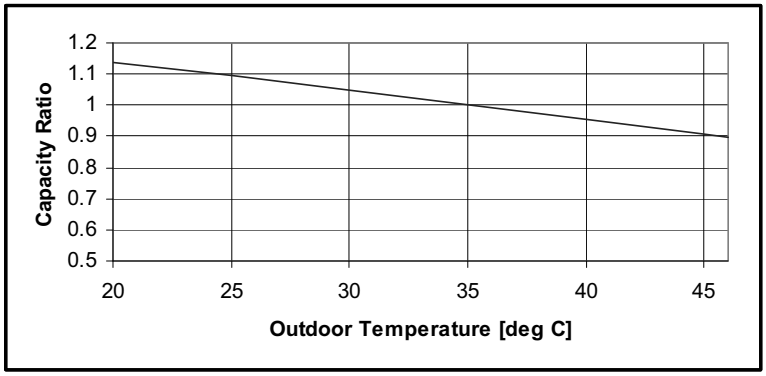
5.1.1 Cooling Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB TEMPERATURE [C^0]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [ºC] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	2.42	2.57	2.73	2.89	3.05
	SC	1.64	1.67	1.71	1.74	1.77
	PI	0.47	0.48	0.49	0.49	0.50
30	TC	2.30	2.46	2.62	2.77	2.93
	SC	1.60	1.63	1.67	1.70	1.73
	PI	0.52	0.53	0.54	0.55	0.56
35	TC	2.18	2.34	**2.50**	2.66	2.82
	SC	1.56	1.59	**1.63**	1.66	1.69
	PI	0.58	0.59	**0.60**	0.60	0.61
40	TC	2.07	2.23	2.38	2.54	2.70
	SC	1.52	1.55	1.58	1.62	1.65
	PI	0.63	0.64	0.65	0.66	0.67
46	TC	1.93	2.09	2.24	2.40	2.56
	SC	1.47	1.50	1.53	1.57	1.60
	PI	0.70	0.71	0.72	0.72	0.73

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (ºC)
DB – Dry Bulb Temp., (ºC)
ID – Indoor
OU - Outdoor

5.1.2 Capacity Correction Factors



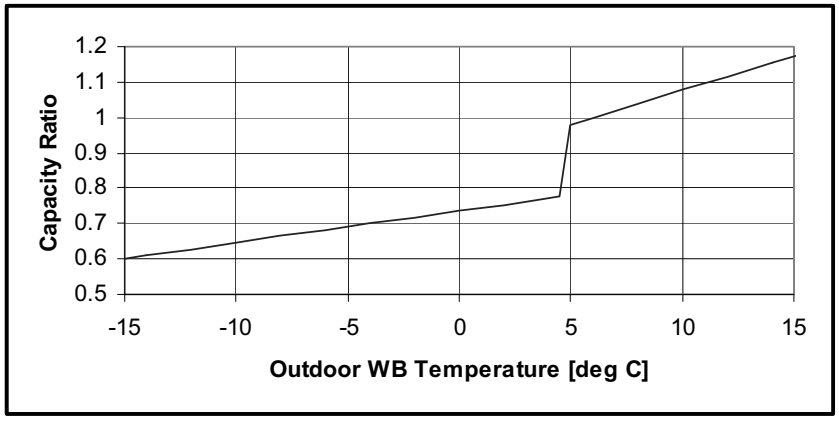
5.1.3 Heating Capacity (kW) - Run Mode)

		ID COIL ENTERING AIR DB TEMPERATURE [ºC]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [ºC]	**DATA**	**15**	**20**	**25**
-15/-16	TC	2.16	2.01	1.86
	PI	0.49	0.54	0.58
-10/-12	TC	2.41	2.26	2.11
	PI	0.59	0.64	0.68
-7/-8	TC	2.59	2.44	2.29
	PI	0.66	0.71	0.76
-1/-2	TC	2.68	2.53	2.38
	PI	0.70	0.75	0.80
2/1	TC	2.75	2.59	2.44
	PI	0.72	0.77	0.82
7/6	TC	3.55	**3.40**	3.25
	PI	0.76	**0.81**	0.86
10/9	TC	3.75	3.60	3.44
	PI	0.81	0.86	0.90
15/12	TC	3.94	3.79	3.64
	PI	0.85	0.90	0.95
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

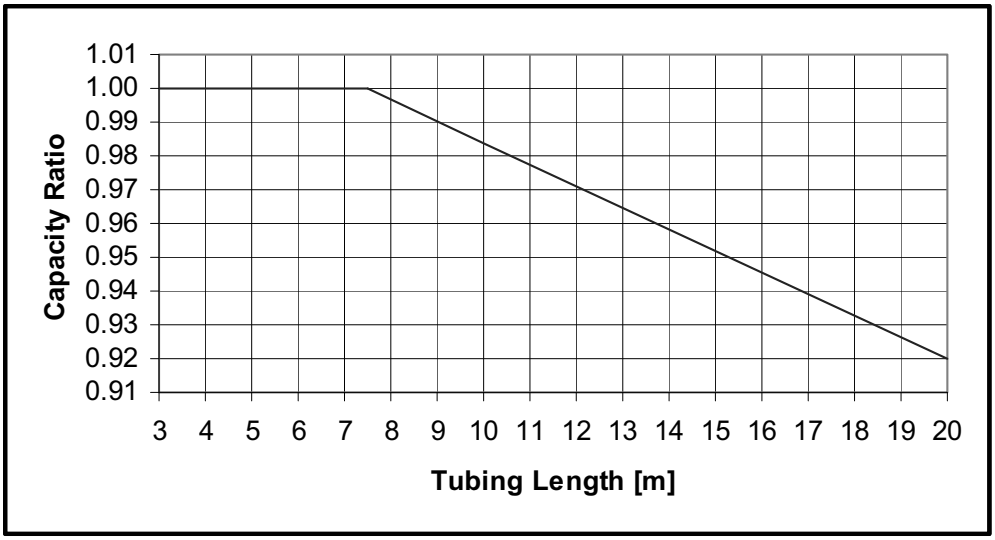
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU - Outdoor

5.1.4 Capacity Correction Factors

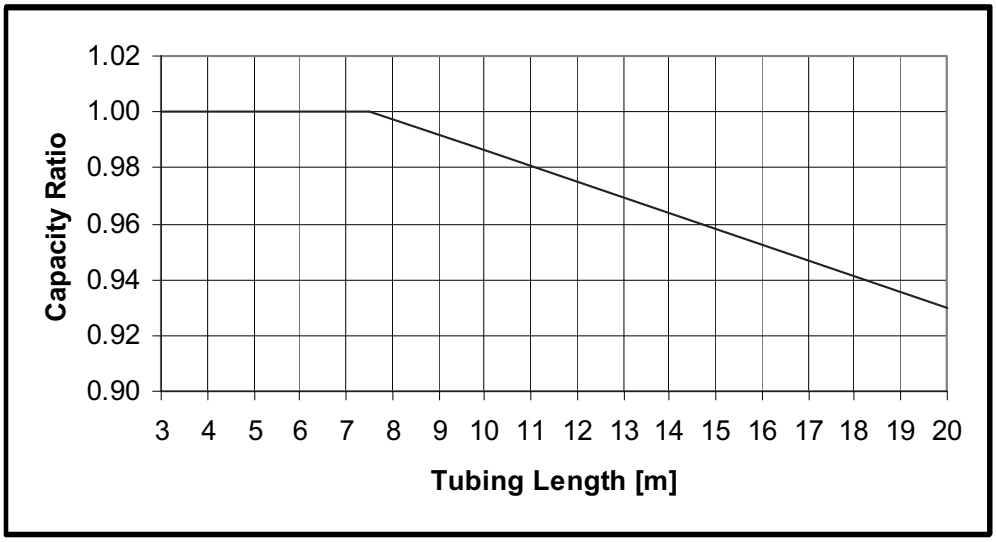


5.2 Capacity Correction Factor Due to Tubing Length

5.2.1 Cooling



5.2.2 Heating



5.3 PNX 12 / GC 12 DCI

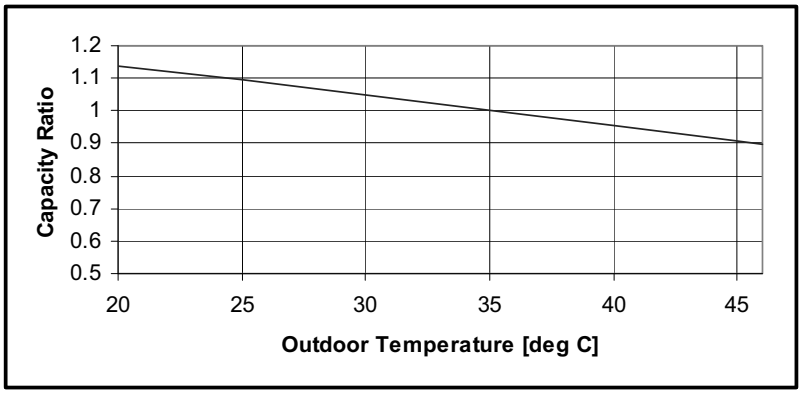
5.3.1 Cooling Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB TEMPERATURE [ºC]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [ºC] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	3.38	3.60	3.83	4.05	4.27
	SC	2.40	2.45	2.50	2.55	2.60
	PI	0.78	0.79	0.81	0.82	0.84
30	TC	3.22	3.44	3.66	3.88	4.11
	SC	2.34	2.39	2.44	2.49	2.54
	PI	0.87	0.88	0.90	0.91	0.93
35	TC	3.06	3.28	**3.50**	3.72	3.94
	SC	2.28	2.33	**2.38**	2.43	2.48
	PI	0.96	0.98	**0.99**	1.00	1.02
40	TC	2.89	3.12	3.34	3.56	3.78
	SC	2.22	2.27	2.32	2.37	2.42
	PI	1.05	1.07	1.08	1.10	1.11
46	TC	2.70	2.92	3.14	3.36	3.58
	SC	2.15	2.20	2.25	2.30	2.34
	PI	1.16	1.18	1.19	1.21	1.22

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU - Outdoor

5.3.2 Capacity Correction Factors



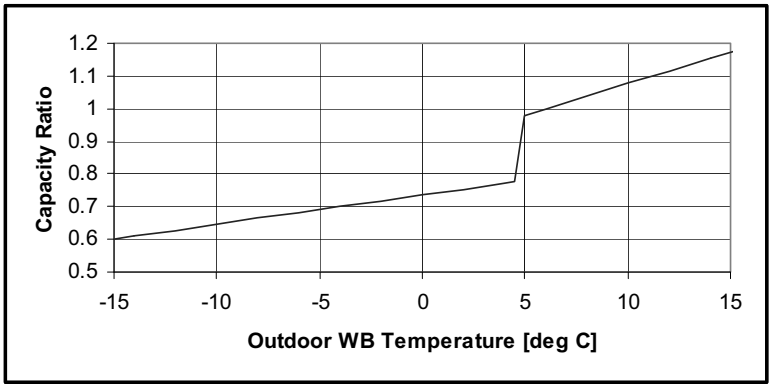
5.3.3 Heating Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB/WB TEMPERATURE [ºC]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [ºC]		
		15	20	25
-15/-16	TC	2.74	2.55	2.35
	PI	0.68	0.74	0.81
-10/-12	TC	3.05	2.86	2.66
	PI	0.81	0.88	0.95
-7/-8	TC	3.28	3.09	2.90
	PI	0.92	0.99	1.06
-1/-2	TC	3.39	3.20	3.01
	PI	0.97	1.04	1.11
2/1	TC	3.47	3.28	3.09
	PI	1.00	1.07	1.14
7/6	TC	4.49	**4.30**	4.11
	PI	1.06	**1.13**	1.19
10/9	TC	4.74	4.55	4.36
	PI	1.12	1.19	1.26
15/12	TC	4.99	4.80	4.60
	PI	1.18	1.25	1.32
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

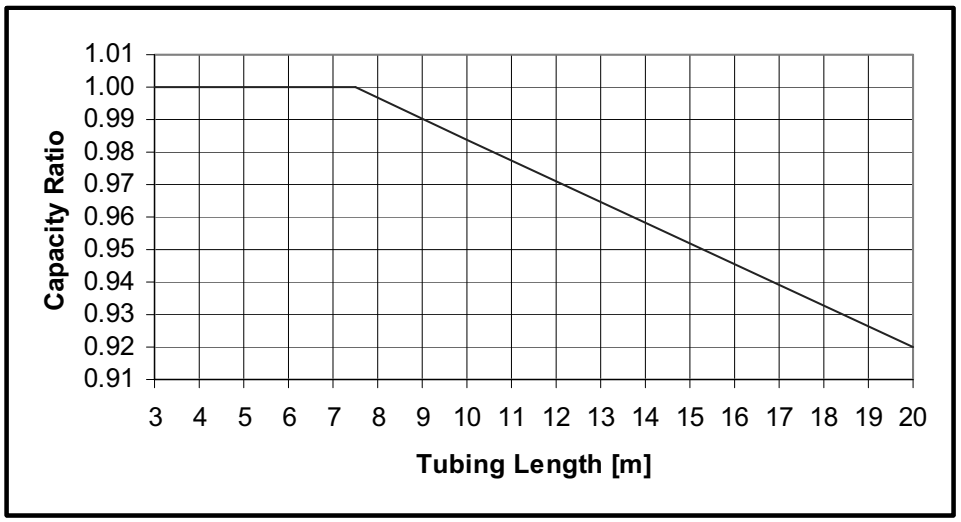
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU - Outdoor

5.3.4 Capacity Correction Factors

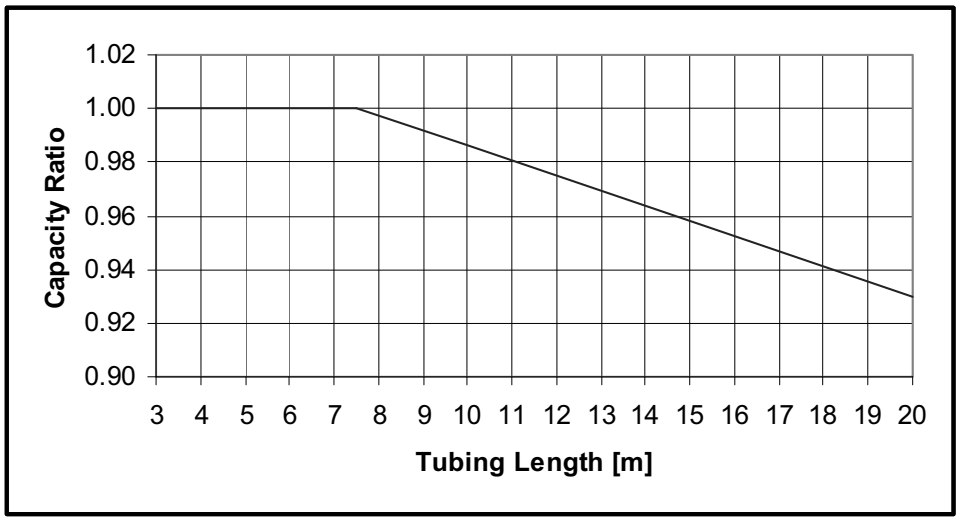


5.4 Capacity Correction Factor Due to TUbing Length

5.4.1 Cooling



5.4.2 Heating



5.5 PNX 18 / GC 18 DCI

5.5.1 Cooling Capacity (kW) - Run Mode

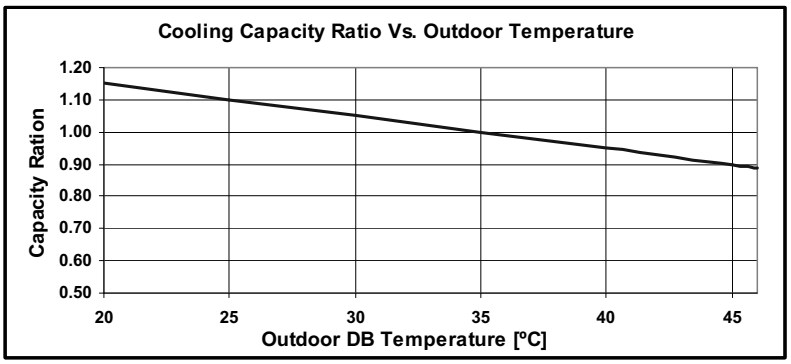
230[V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB TEMPERATURE [°C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [°C]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	4.93	5.22	5.51	5.80	6.09
	SC	4.10	4.16	4.22	4.28	4.34
	PI	1.10	1.13	1.15	1.18	1.20
30	TC	4.67	4.96	5.25	5.54	5.83
	SC	3.94	4.00	4.06	4.12	4.18
	PI	1.26	1.28	1.31	1.33	1.36
35	TC	4.42	4.71	**5.00**	5.29	5.58
	SC	3.78	3.84	**3.90**	3.96	4.02
	PI	1.41	1.44	**1.46**	1.48	1.51
40	TC	4.17	4.46	4.75	5.04	5.53
	SC	3.62	3.68	3.74	3.80	3.86
	PI	1.56	1.59	1.61	1.64	1.66
46	TC	3.86	4.15	4.44	4.73	5.02
	SC	3.43	3.49	3.55	3.61	3.67
	PI	1.75	1.77	1.80	1.82	1.85

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

5.5.2 Capacity Correction Factors



5.5.3 Heating Capacity (kW) - Run Mode)

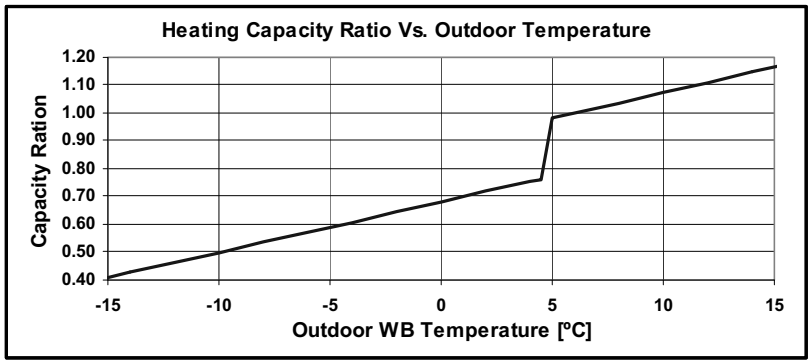
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [°C]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [°C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	2.73	2.34	1.94
	PI	1.16	1.24	1.33
-10/-12	TC	3.60	3.21	2.82
	PI	1.31	1.40	1.48
-7/-8	TC	4.26	3.87	3.47
	PI	1.43	1.51	1.59
-1/-2	TC	4.59	4.19	3.80
	PI	1.48	1.57	1.65
2/1	TC	4.81	4.41	4.02
	PI	1.52	1.60	1.69
7/6	TC	6.39	**6.00**	5.61
	PI	1.58	**1.66**	1.74
10/9	TC	6.72	6.33	5.94
	PI	1.61	1.69	1.77
15/12	TC	7.06	6.66	6.27
	PI	1.64	1.72	1.80
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

5.5.4 Capacity Correction Factors



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5.6 PNX 21 / GC 21 DCI

5.6.1 Cooling Capacity (kW) - Run Mode

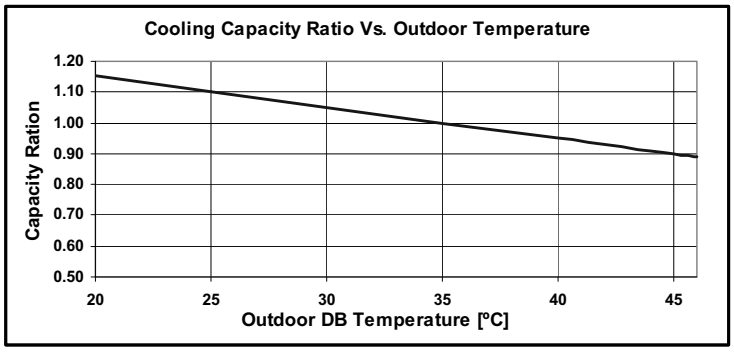
230[V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB TEMPERATURE [°C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [°C] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	5.91	6.26	6.61	6.95	7.30
	SC	4.64	4.71	4.78	4.85	4.92
	PI	1.50	1.54	1.57	1.61	1.64
30	TC	5.61	5.96	6.30	6.65	7.00
	SC	4.46	4.53	4.60	4.67	4.74
	PI	1.71	1.75	1.78	1.81	1.85
35	TC	5.30	5.65	**6.00**	6.35	6.70
	SC	4.28	4.35	**4.42**	4.49	4.56
	PI	1.92	1.96	**1.99**	2.02	2.06
40 (Protection Range)	TC	5.00	5.35	5.70	6.05	6.39
	SC	4.10	4.17	4.24	4.31	4.38
	PI	2.13	2.17	2.20	2.23	2.27
46 (Protection Range)	TC	4.64	4.99	5.33	5.68	6.03
	SC	3.88	3.95	4.02	4.09	4.16
	PI	2.38	2.42	2.45	2.48	2.52

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

5.6.2 Capacity Correction Factors



5.6.3 Heating Capacity (kW) - Run Mode

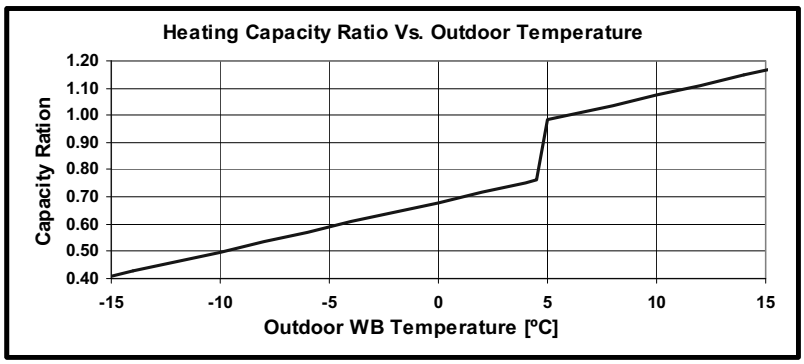
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [°C]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [°C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	2.96	2.53	2.11
	PI	1.33	1.42	1.52
-10/-12	TC	3.90	3.48	3.05
	PI	1.50	1.60	1.69
-7/-8	TC	4.61	4.19	3.76
	PI	1.63	1.73	1.82
-1/-2	TC	4.97	4.54	4.12
	PI	1.70	1.79	1.82
2/1	TC	5.21	4.78	4.35
	PI	1.74	1.84	1.93
7/6	TC	6.93	**6.50**	6.07
	PI	1.81	**1.90**	2.00
10/9	TC	7.28	6.86	6.43
	PI	1.84	1.93	2.03
15/12	TC	7.64	7.22	6.79
	PI	1.87	1.97	2.06
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

5.6.4 Capacity Correction Factors



5.7 PNX 24 / GC 24 Z DCI

5.7.1 Cooling Capacity (kW) - Run Mode

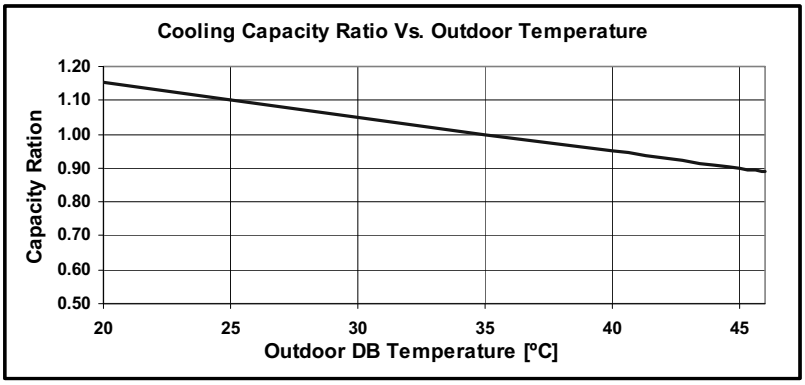
230[V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB TEMPERATURE [°C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [°C] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	6.70	7.09	7.49	7.88	8.28
	SC	5.04	5.12	5.19	5.27	5.34
	PI	1.70	1.74	1.78	1.82	1.85
30	TC	6.35	6.75	7.14	7.54	7.93
	SC	4.85	4.92	5.00	5.07	5.15
	PI	1.94	1.98	2.01	2.05	2.09
35	TC	6.01	6.41	**6.80**	7.19	7.59
	SC	4.65	4.73	**4.80**	4.87	4.95
	PI	2.17	2.21	**2.25**	2.29	2.33
40 (Protection Range)	TC	5.67	6.06	6.46	6.85	7.25
	SC	4.45	4.53	4.60	4.68	4.75
	PI	2.41	2.45	2.49	2.52	2.56
46 (Protection Range)	TC	5.26	5.65	6.04	6.44	6.83
	SC	4.22	4.29	4.37	4.44	4.52
	PI	2.69	2.73	2.77	2.81	2.85

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

5.7.2 Capacity Correction Factors



5.7.3 Heating Capacity (kW) - Run Mode

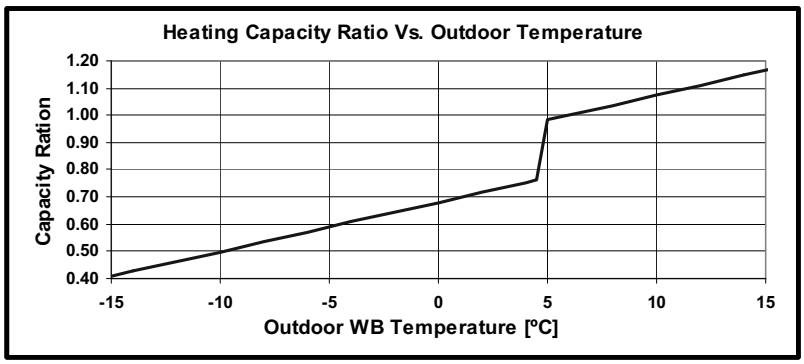
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [°C]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [°C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	3.21	2.75	2.28
	PI	1.53	1.64	1.75
-10/-12	TC	4.23	3.77	3.31
	PI	1.73	1.84	1.95
-7/-8	TC	5.00	4.54	4.08
	PI	1.88	1.99	2.10
-1/-2	TC	5.39	4.93	4.47
	PI	1.96	2.07	2.17
2/1	TC	5.65	5.18	4.72
	PI	2.01	2.12	2.22
7/6	TC	7.51	**7.05**	6.59
	PI	2.08	**2.19**	2.30
10/9	TC	7.90	7.44	6.98
	PI	2.12	2.23	2.34
15/12	TC	8.28	7.83	7.37
	PI	2.16	2.27	2.38
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

5.7.4 Capacity Correction Factors



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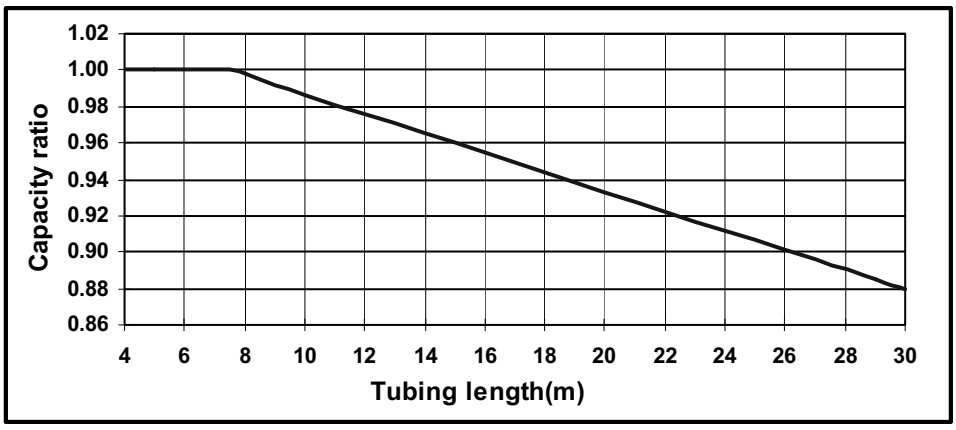
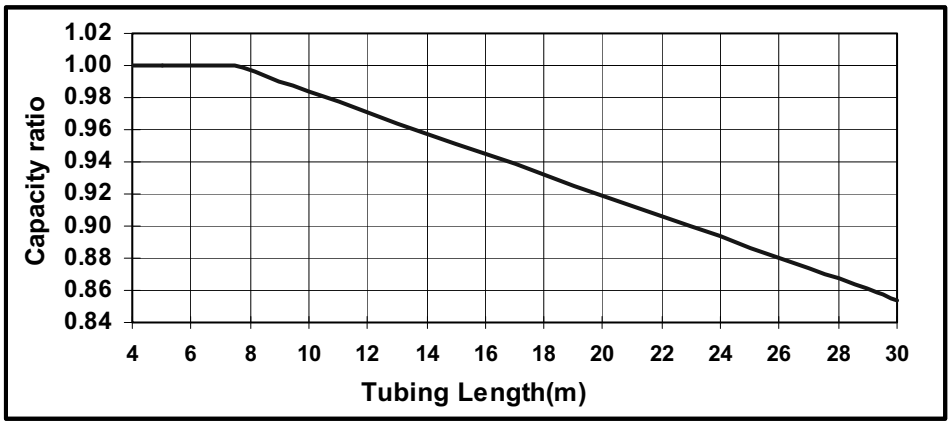
5.8 Capacity Correction Factor Due to Tubing Length

5.8.1 PNX 18 / 21 / 24 Z DCI: Cooling

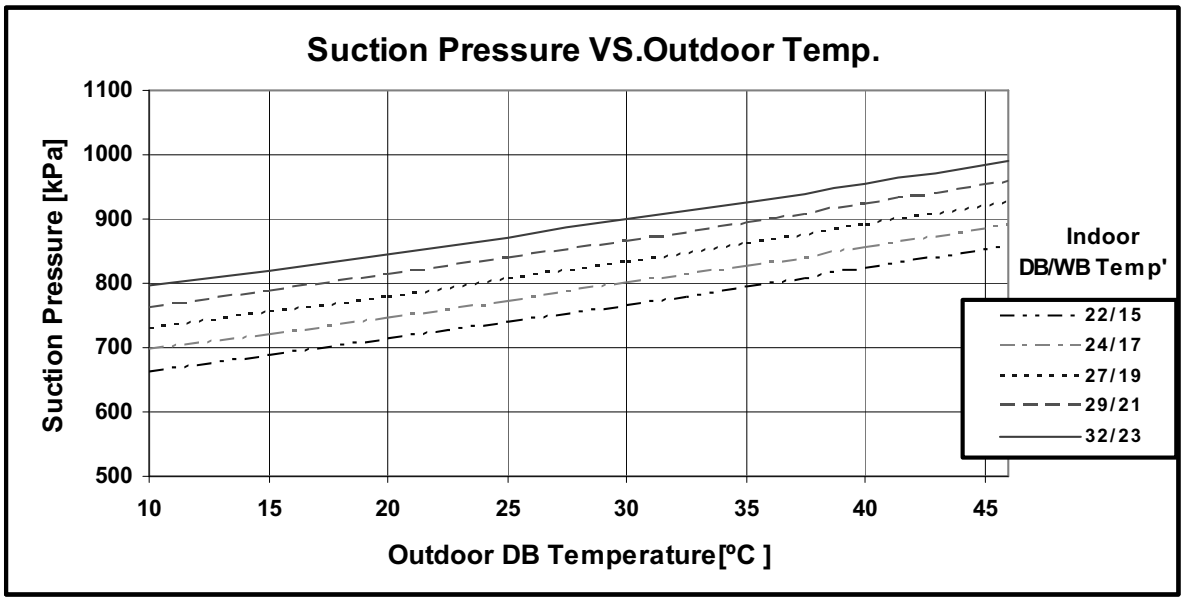


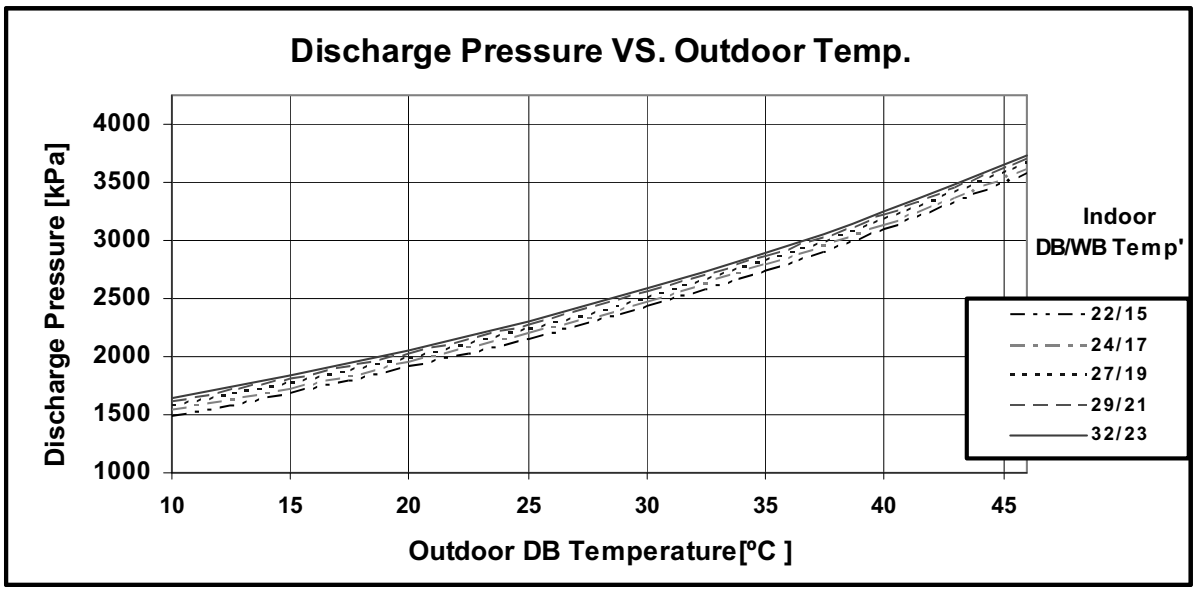
5.8.2 Heating



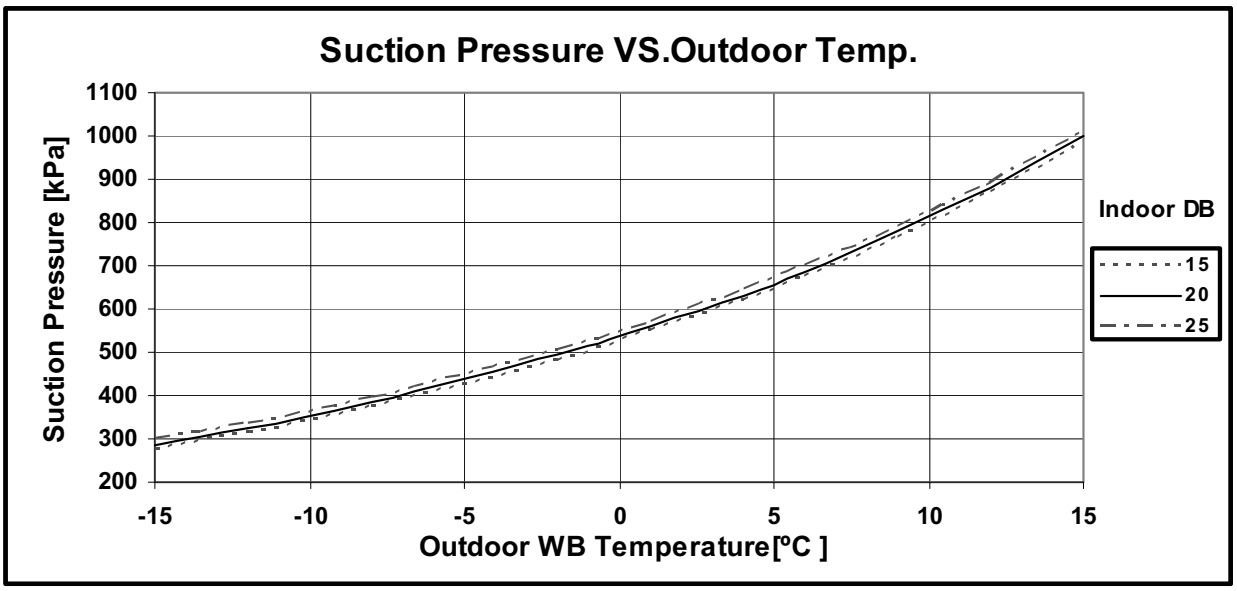
5.9 Pressure Curves

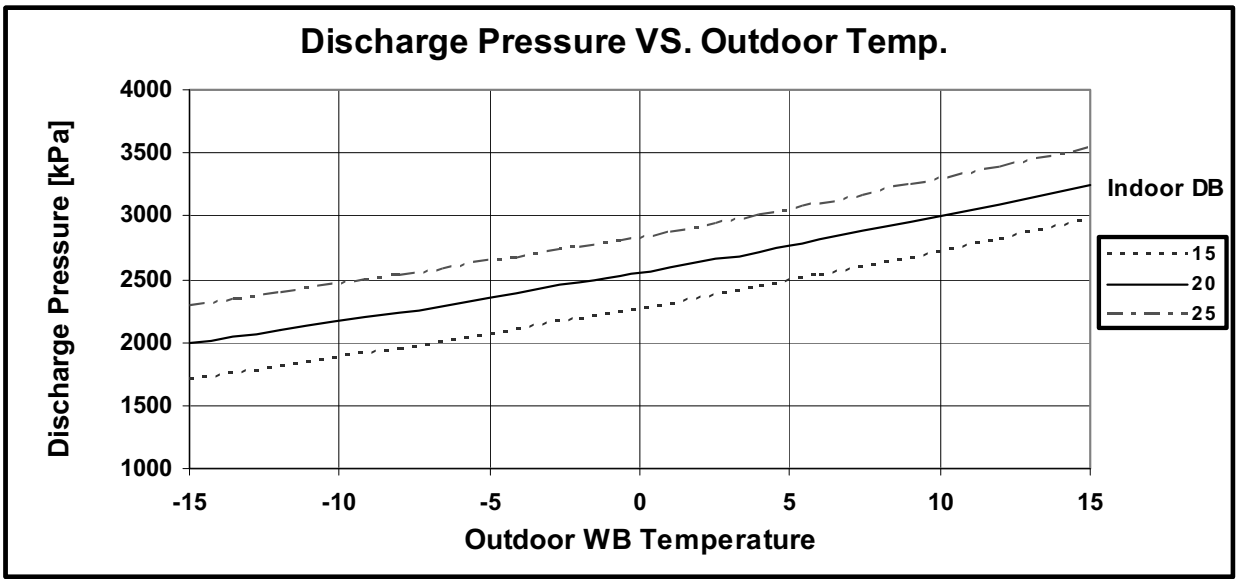
5.9.1. Model: PNX 18 / GC 18 DCI Cooling — Test Mode



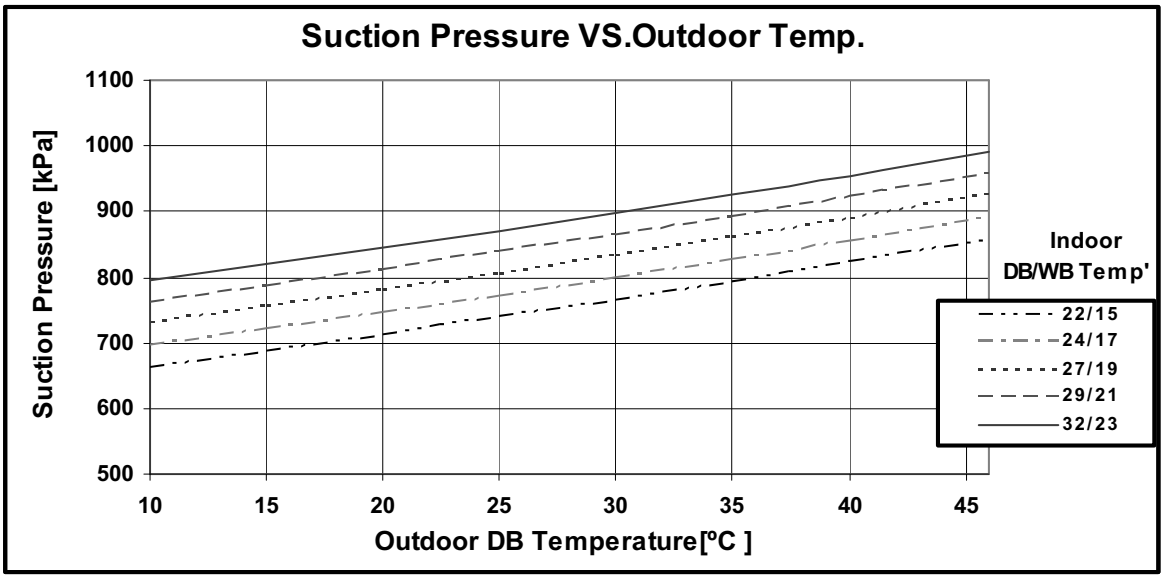


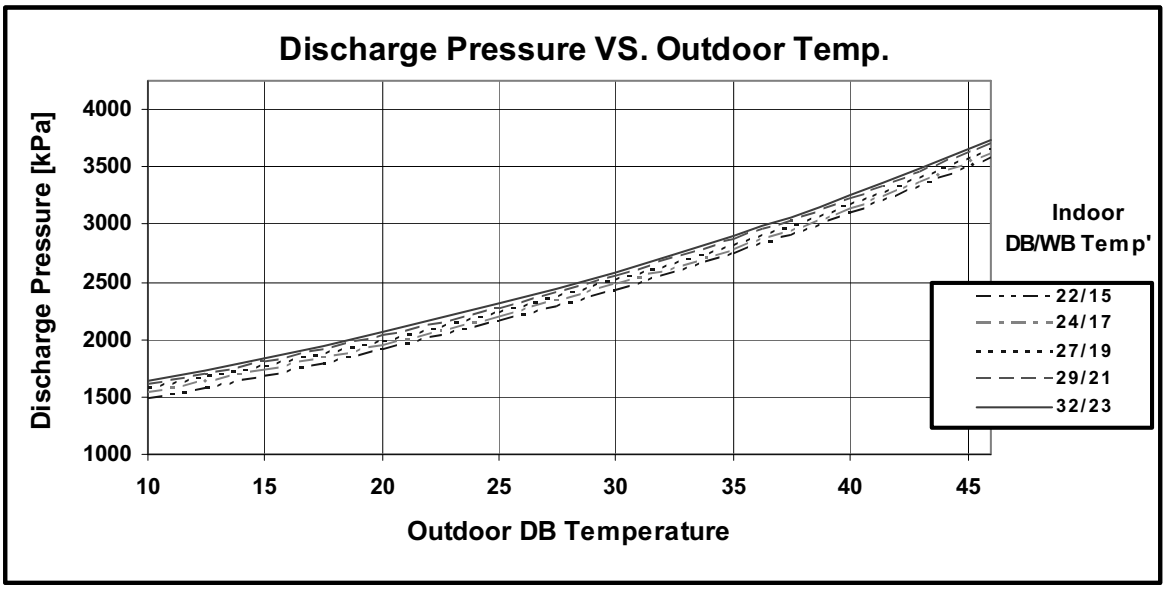
5.9.2. Heating — Test Mode



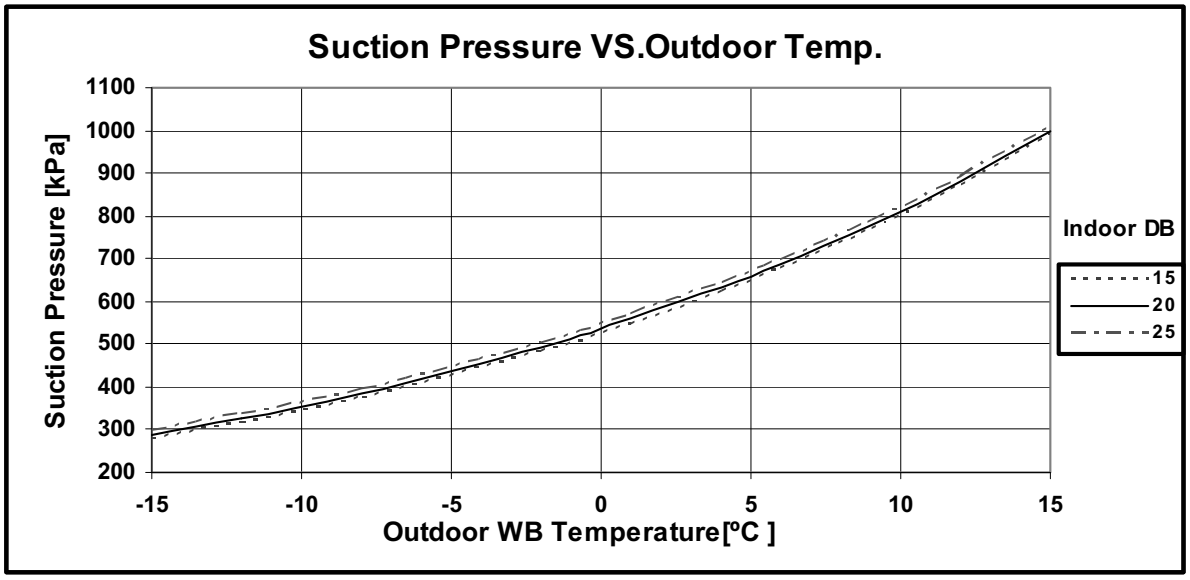


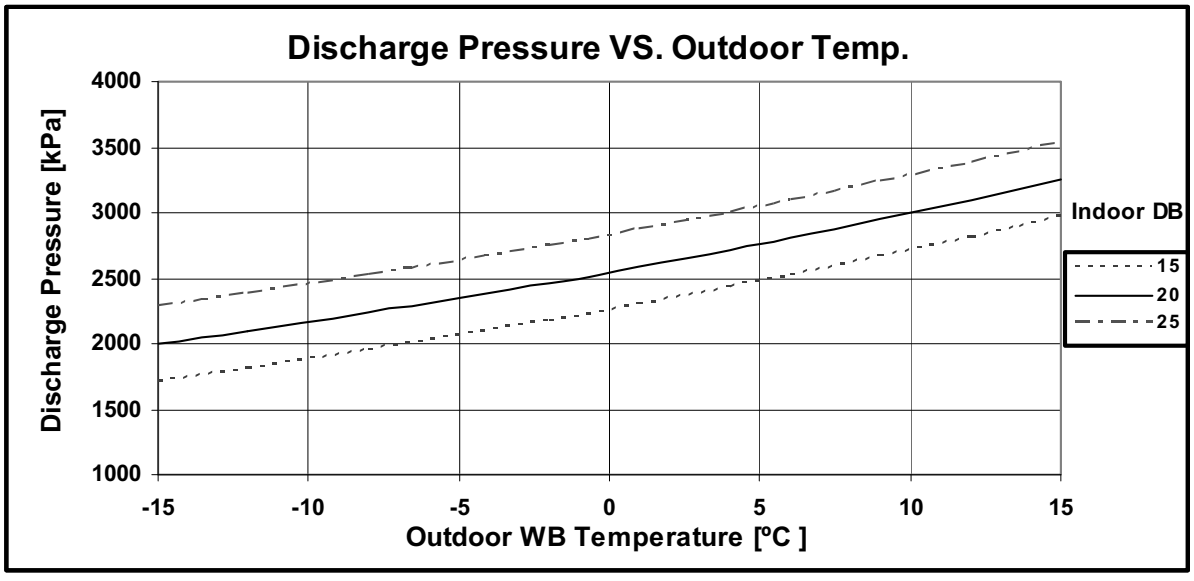
5.9.3 Model: PNX 21 / GC 21 DCI Cooling — Test Mode.



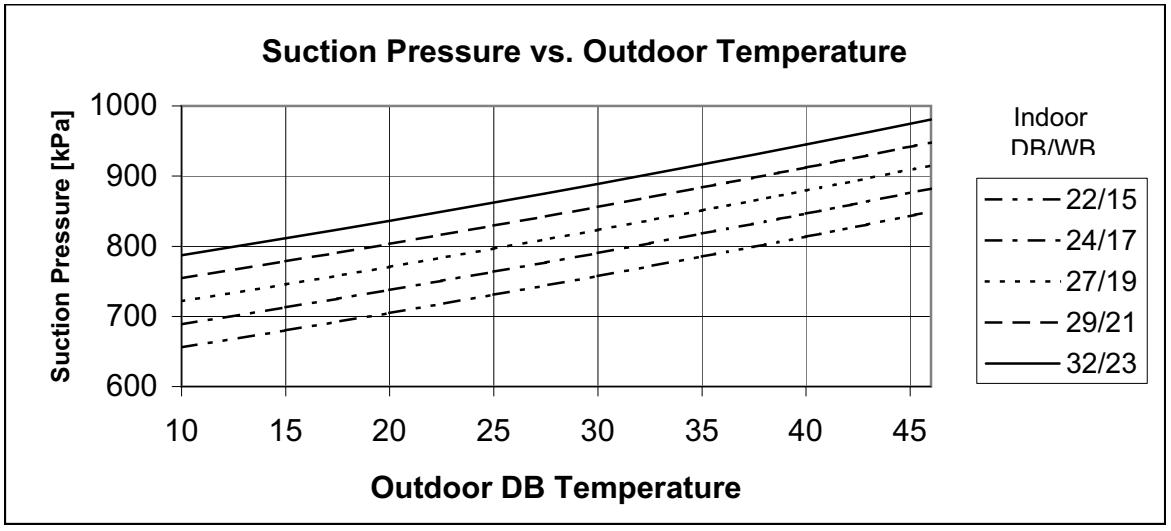


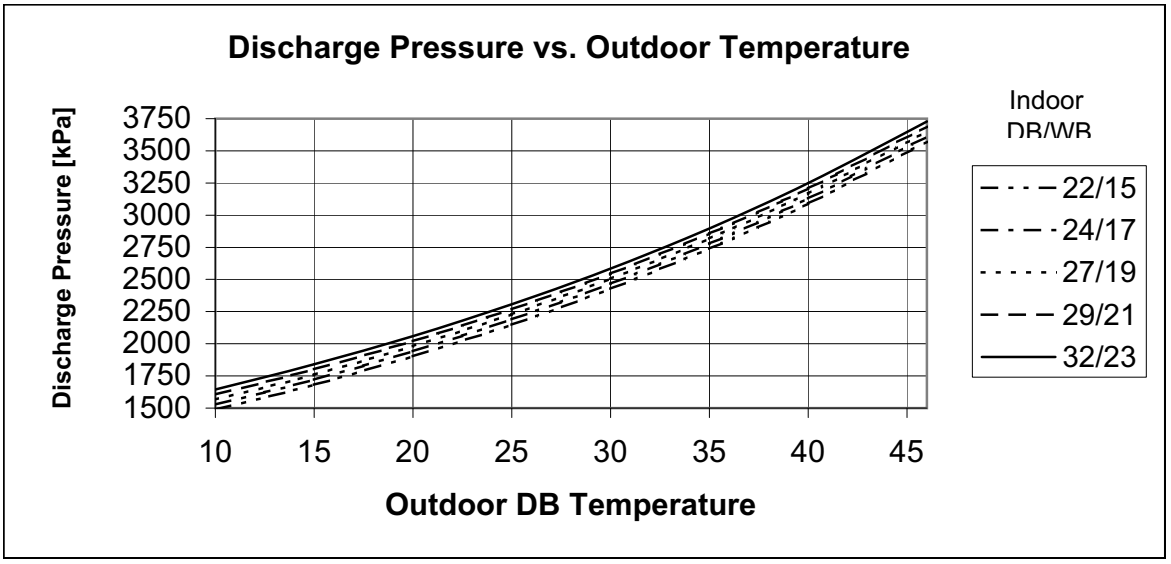
5.9.4 Heating — Test Mode



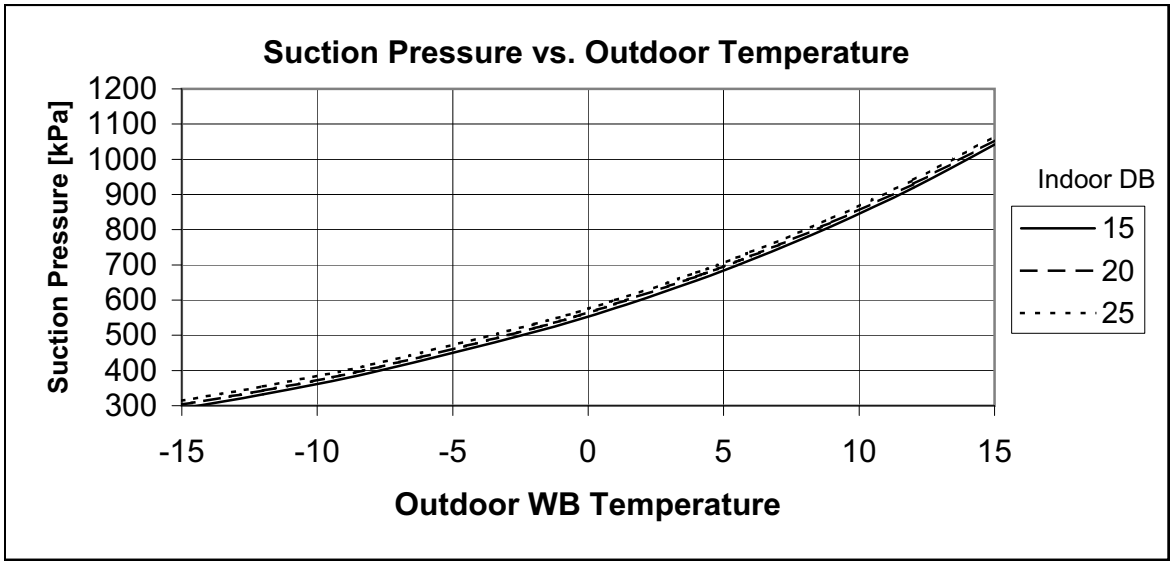


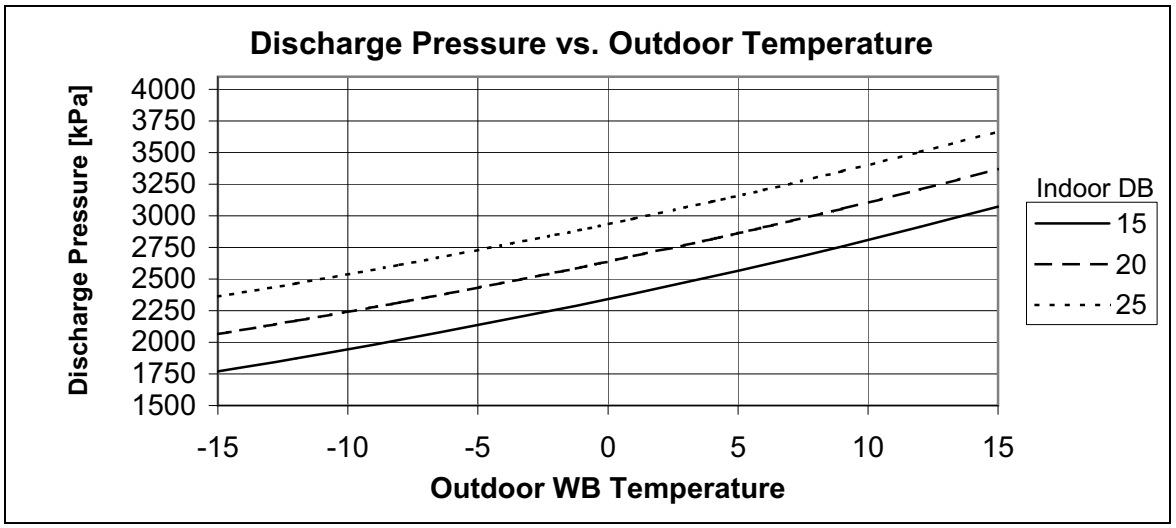
5.9.5 Model: PNX 24 / GC 24 Z DCI Cooling — Test Mode.





5.9.6 Heating — Test Mode





6. SOUND LEVEL CHARACTERISTICS

6.1 Sound Pressure Level

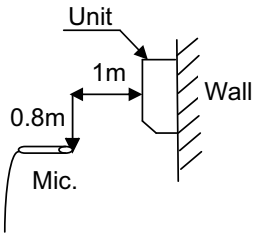
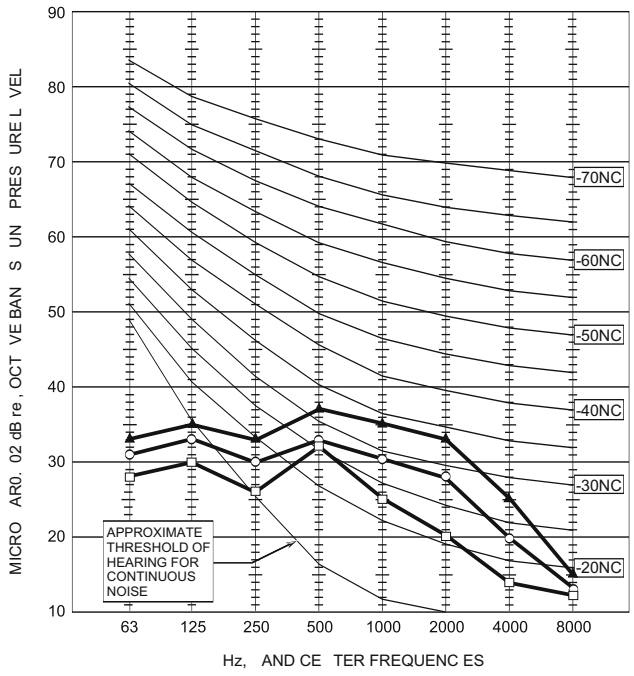


Figure 1

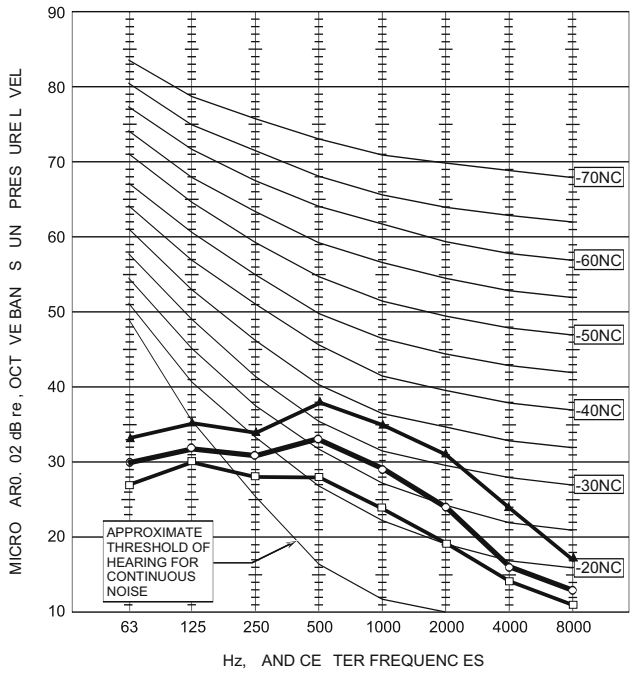
FAN SPEED	LINE
HI	▲—
ME	—○—
LO	—□—

6.2 Sound Pressure Level Spectrum (Measured as Figure 1)

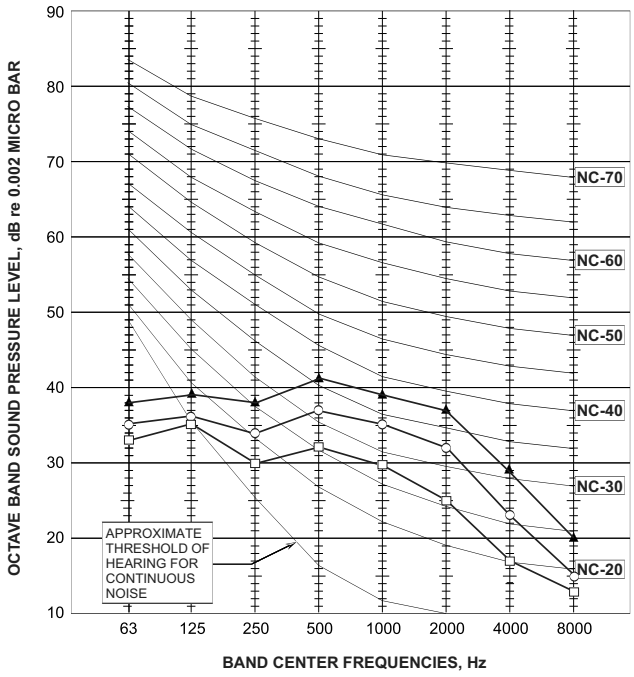
PNX 9



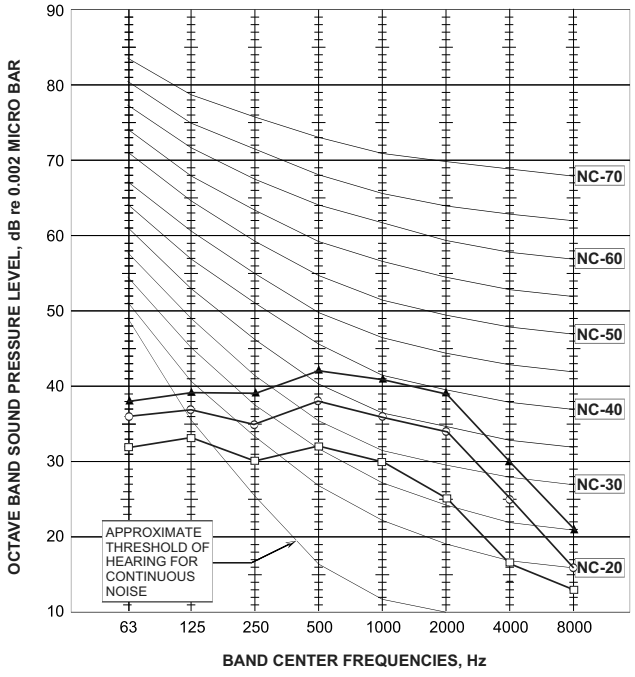
PNX 12



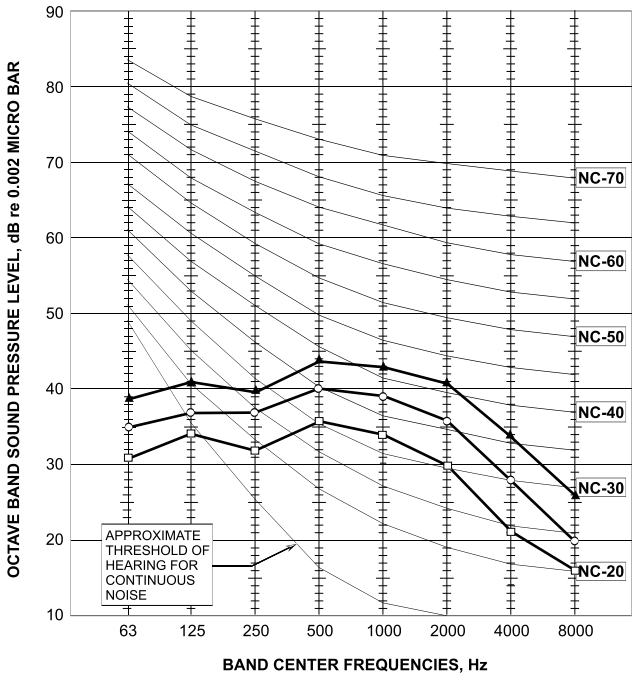
PNX 18



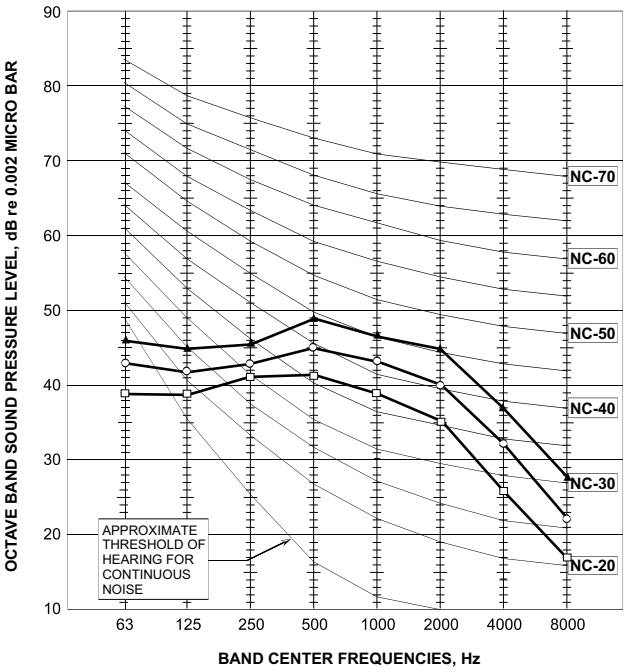
PNX 21



PNX 24


OCTAVE BAND SOUND PRESSURE LEVEL, dB re 0.002 MICRO BAR
90
80
70
60
50
40
30
20
10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
APPROXIMATE THRESHOLD OF HEARING FOR CONTINUOUS NOISE
63
125
250
500
1000
2000
4000
8000
BAND CENTER FREQUENCIES, Hz

FLO 30


OCTAVE BAND SOUND PRESSURE LEVEL, dB re 0.002 MICRO BAR
90
80
70
60
50
40
30
20
10
NC-70
NC-60
NC-50
NC-40
NC-30
NC-20
APPROXIMATE THRESHOLD OF HEARING FOR CONTINUOUS NOISE
63
125
250
500
1000
2000
4000
8000
BAND CENTER FREQUENCIES, Hz

6.3 Outdoor units

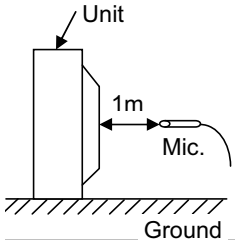
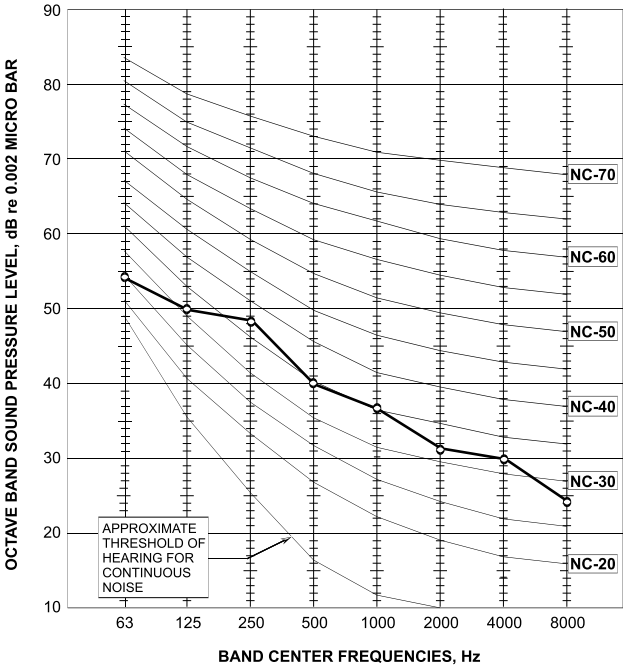


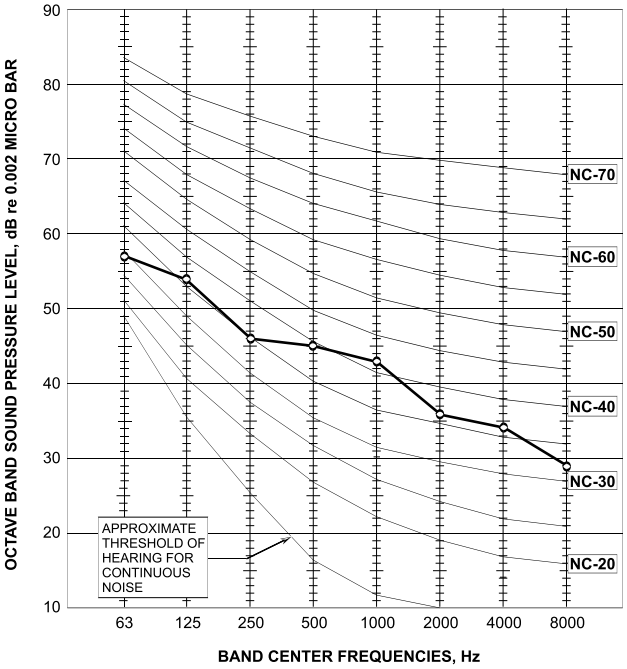
Figure 2

6.4 Sound Pressure Level Spectrum (Measured as Figure 2)

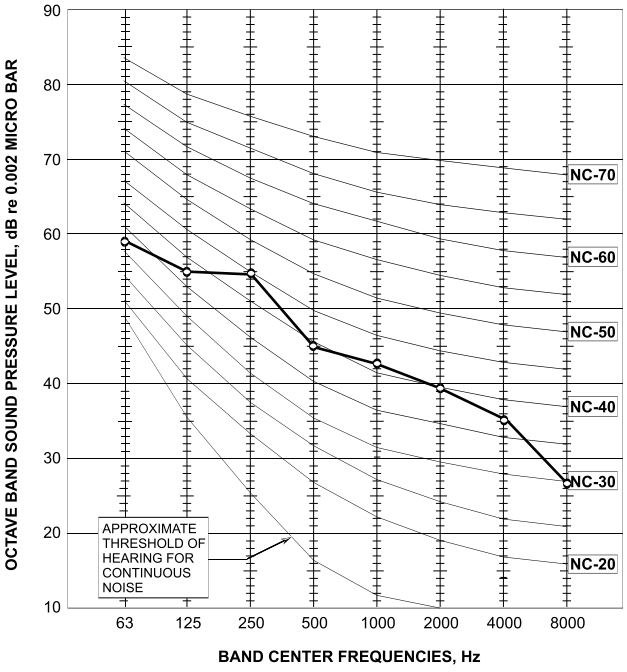
GC 9 DCI Cooling



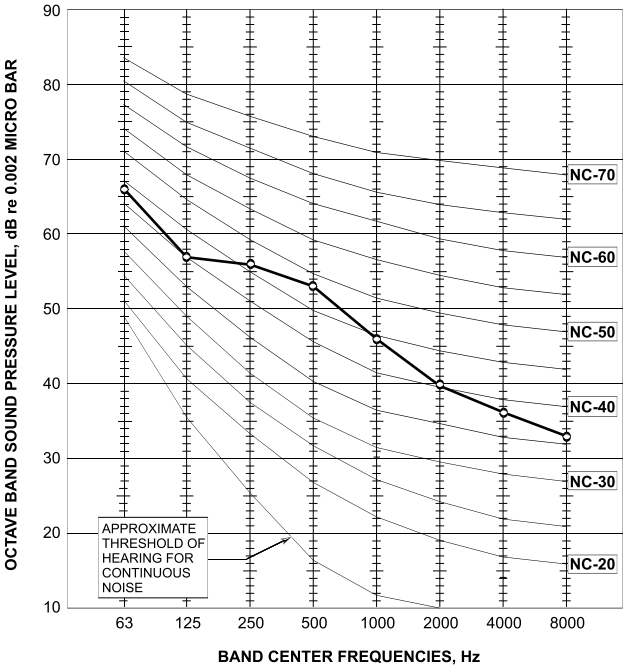
GC 9 DCI Heating



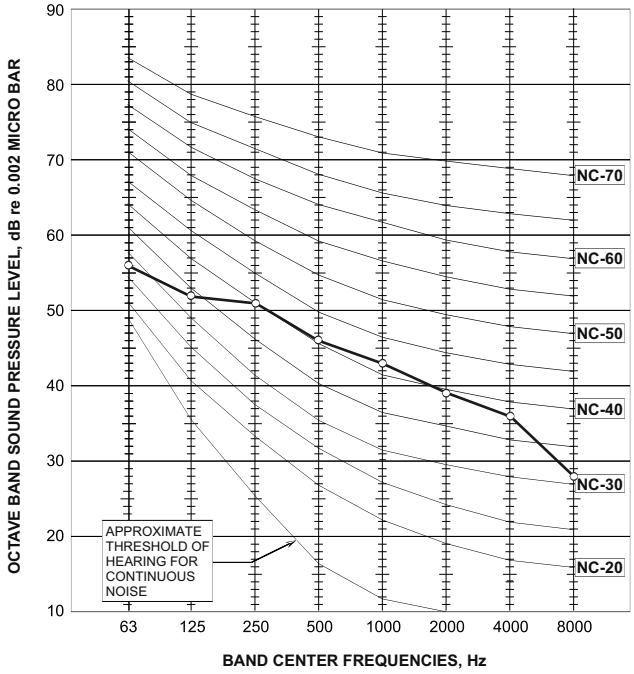
GC 12 DCI Cooling



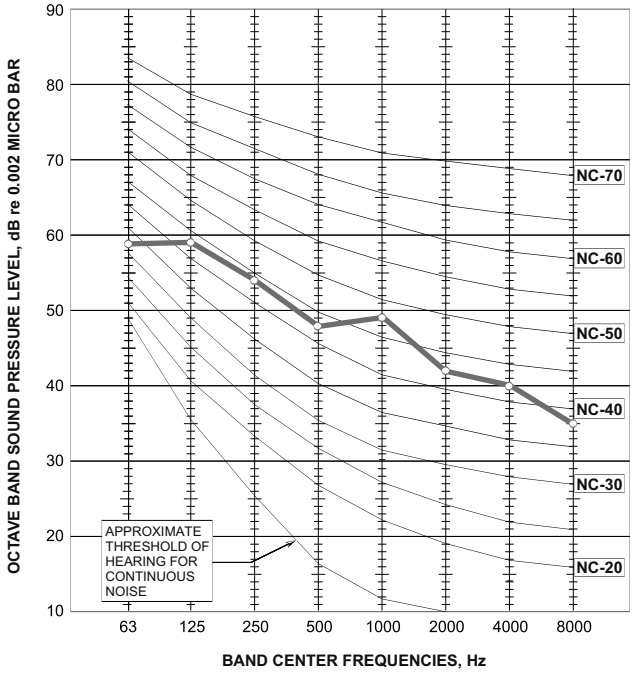
GC 12 DCI Heating



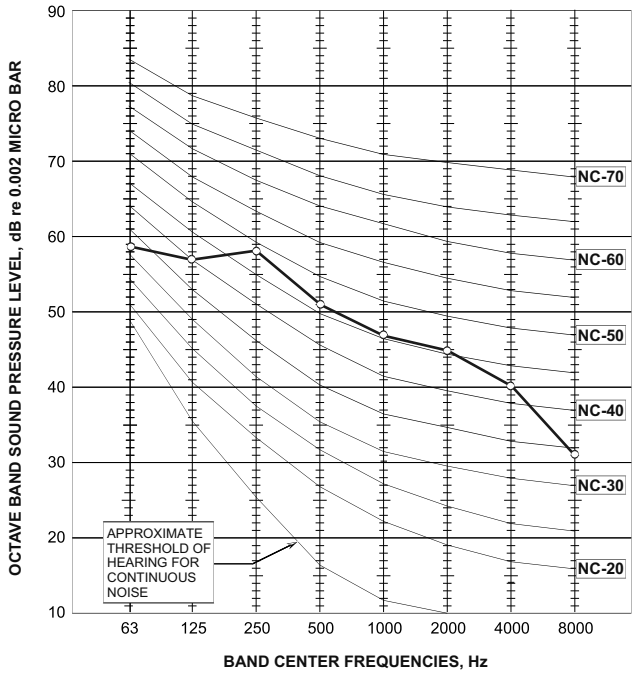
GC 18 DCI Cooling



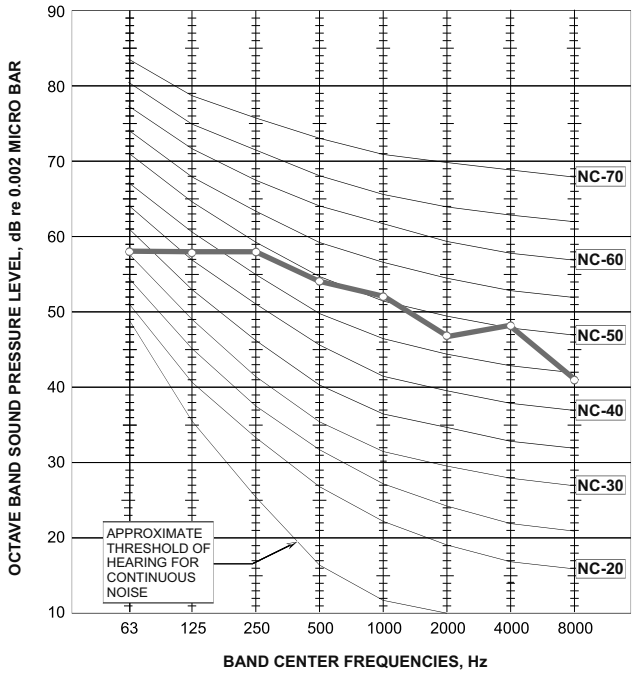
GC 18 DCI Heating



GC 21 DCI Cooling

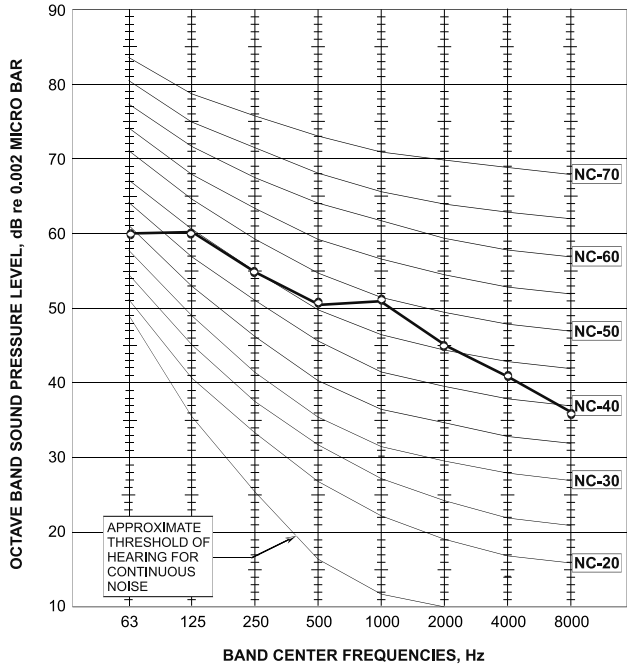


GC 21 DCI Heating

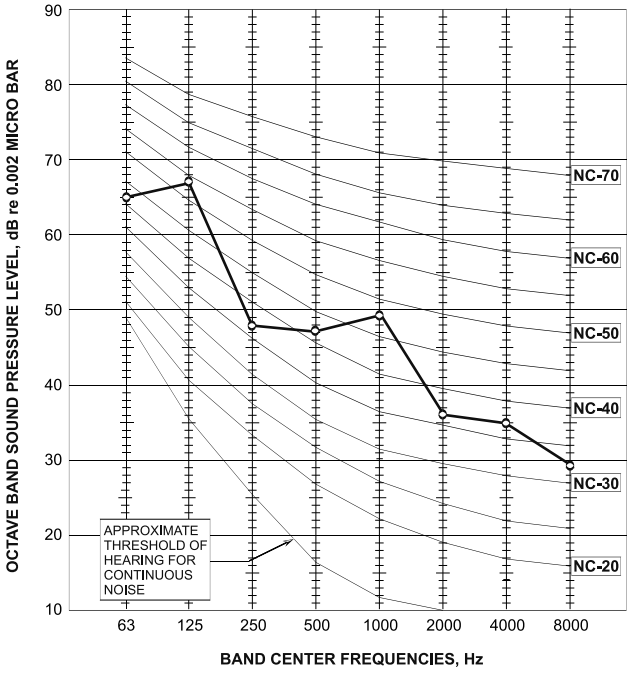


Sound Pressure Level Spectrum (Measured as Figure 2)

GC 24 Z DCI Cooling



GC 24 Z DCI Heating



7. ELECTRICAL DATA

7.1 Single Phase Unit

Model	PNX 25 DCI	PNX 35 DCI	PNX 50 DCI	PNX 60 DCI	PNX 72 DCI
Power Supply	1 PH ,220-240VAC ,50HZ				
Connected to	To indoor				To outdoor
Maximum Current	10A		13.5A	15A	15.7A
Inrush Current \(a)	35A		45 A		<35A
Starting Current\(b)	10A		13.5 A	15A	15.7A
Circuit Breaker	16A		20 A		
Power Supply	3 X 1.5 mm²		3 X 2.5 mm²		
Interconnecting cable	4 X 1.5 mm²		4 X 2.5 mm²		

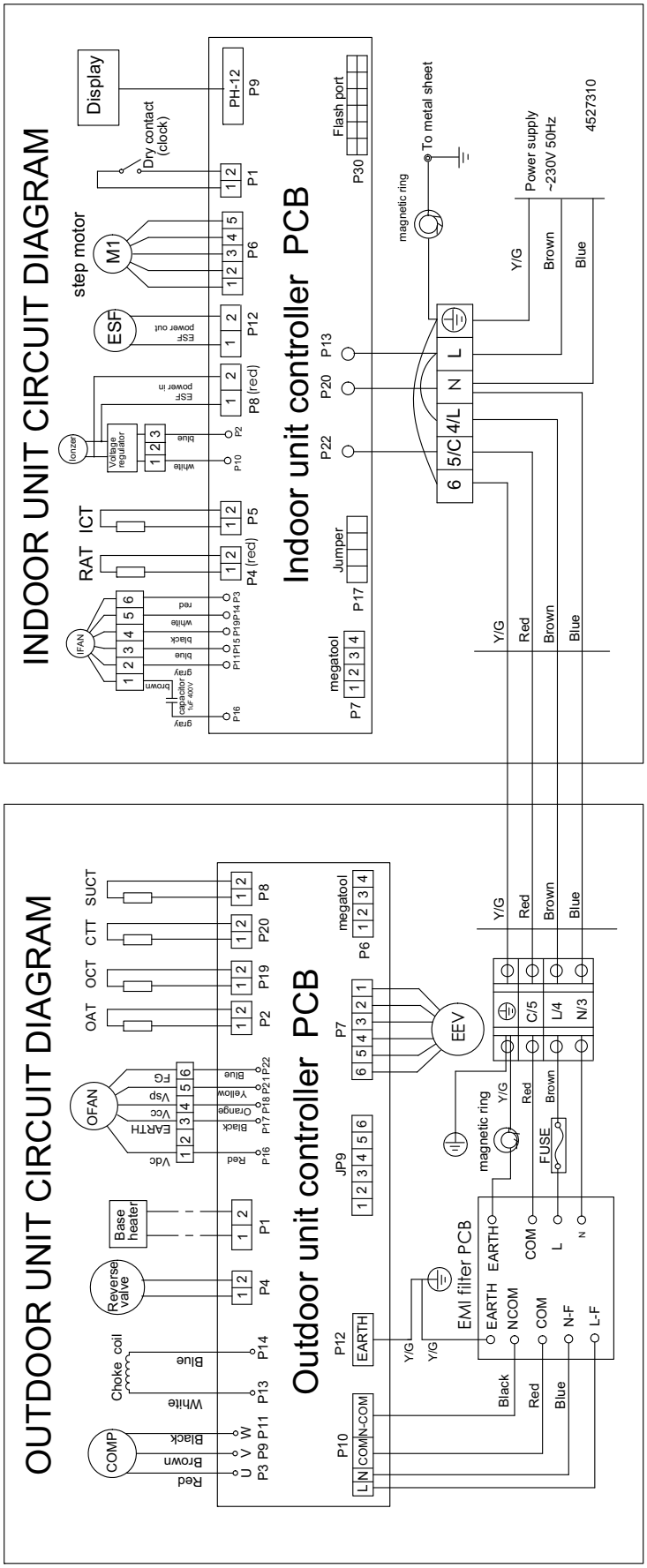
(a) Inrush current is the current when power is up (charging the DC capacitors at outdoor unit controller).
(b) Starting current is the current at compressor start up.

NOTE

Power wiring cord should comply with local lows and electrical regulations requirements.

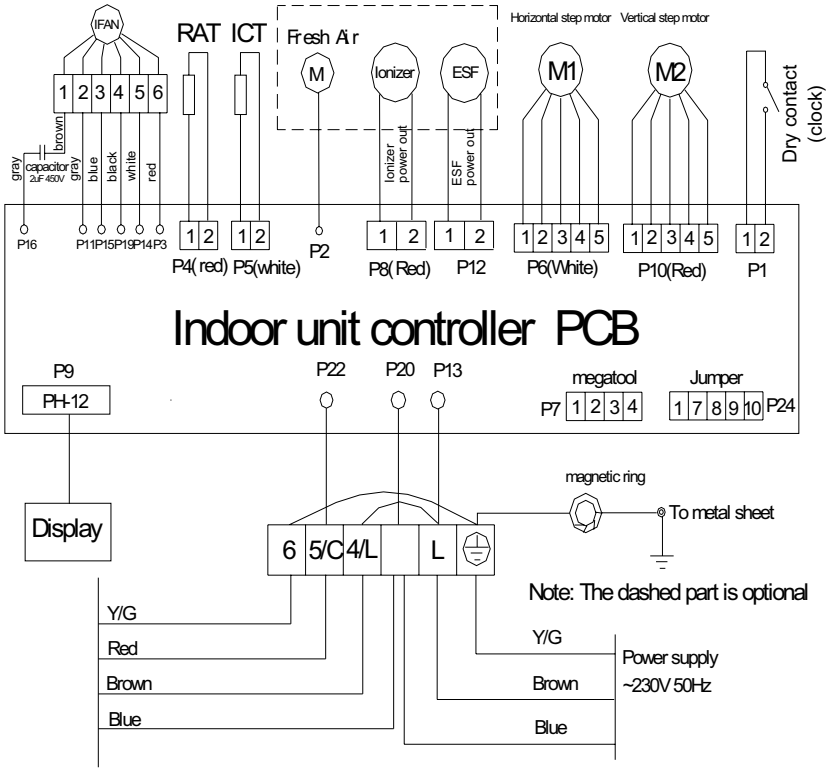
8. WIRING DIAGRAMS

8.1 Indoor & Outdoor Units: PNX 9, 12 / GC 9, 12 DCI

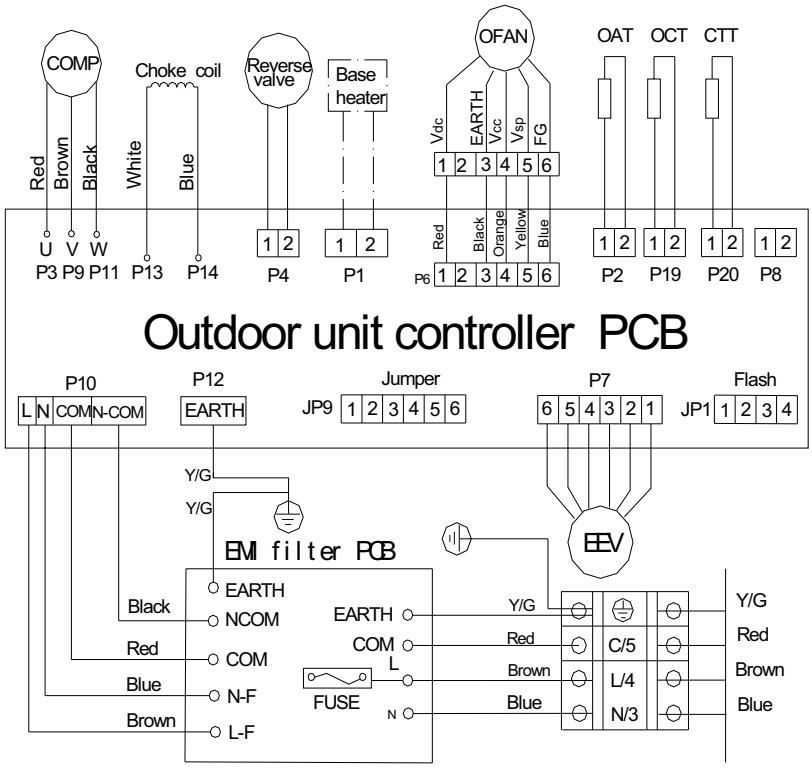


CONTENTS

8.2 Indoor Unit: PNX 18 / PNX 21 DCI

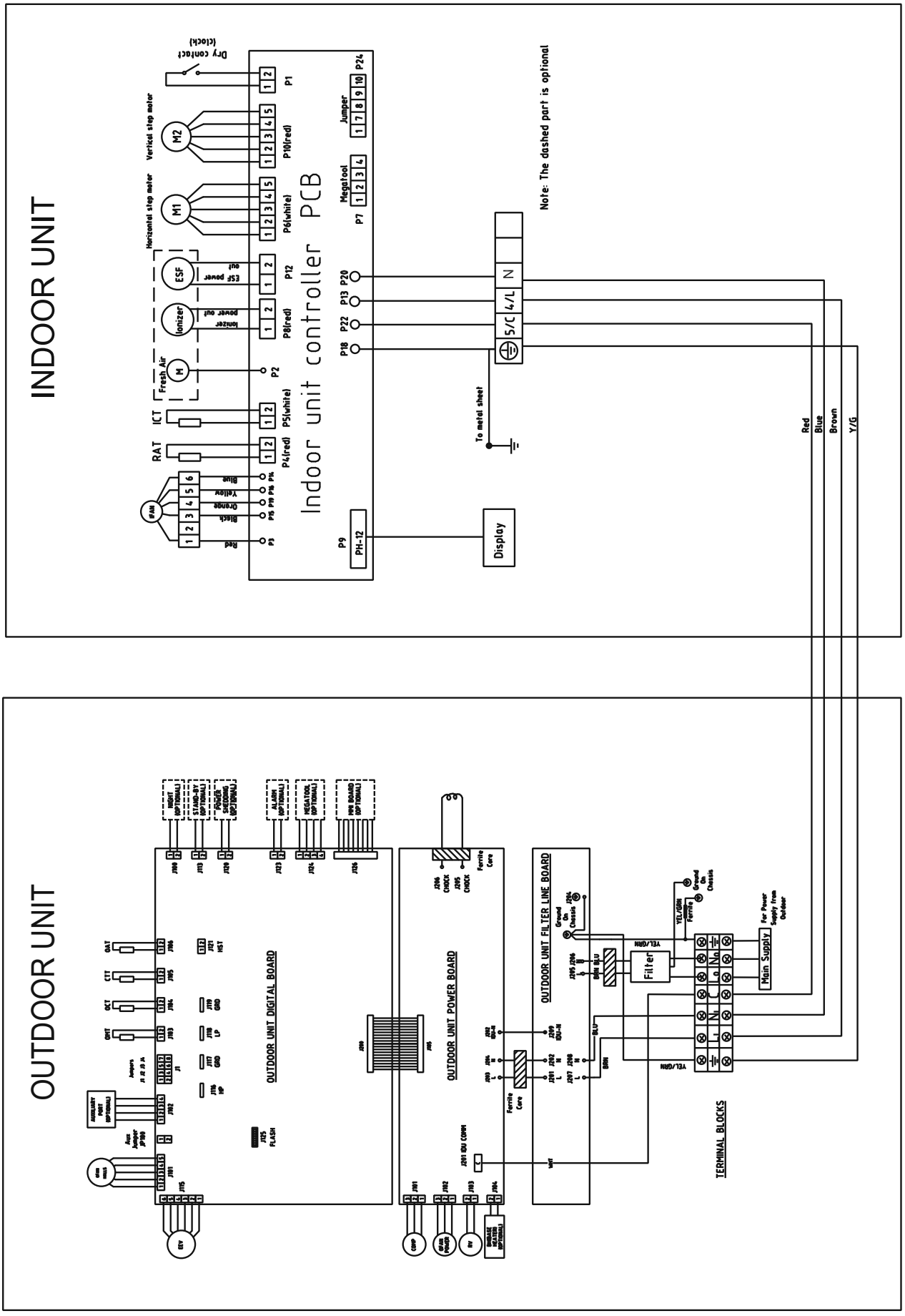


8.3 Outdoor Unit: GC 18 DCI / GC 21 DCI



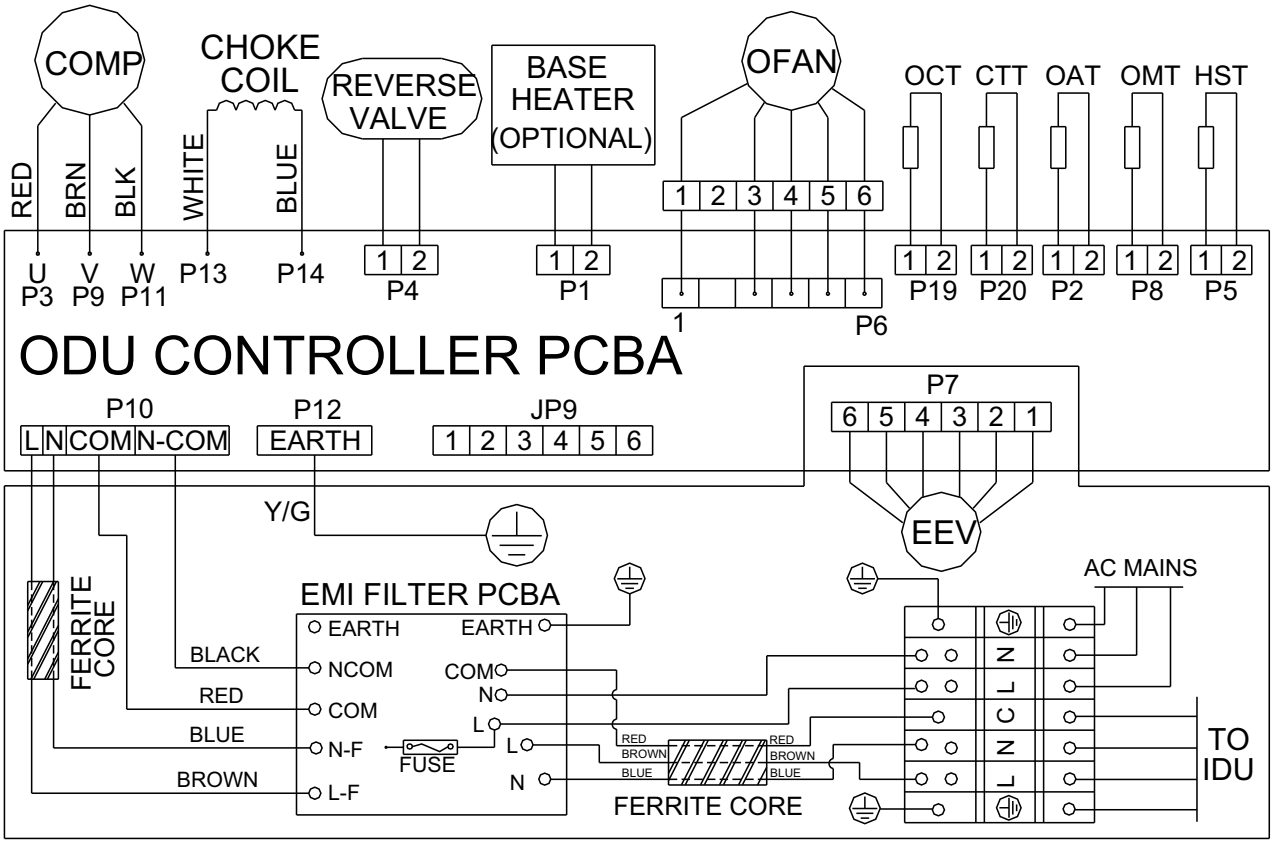
CONTENTS

8.4 Indoor & Outdoor Units: PNX 24 DCI / GC 24 DCI



CONTENTS

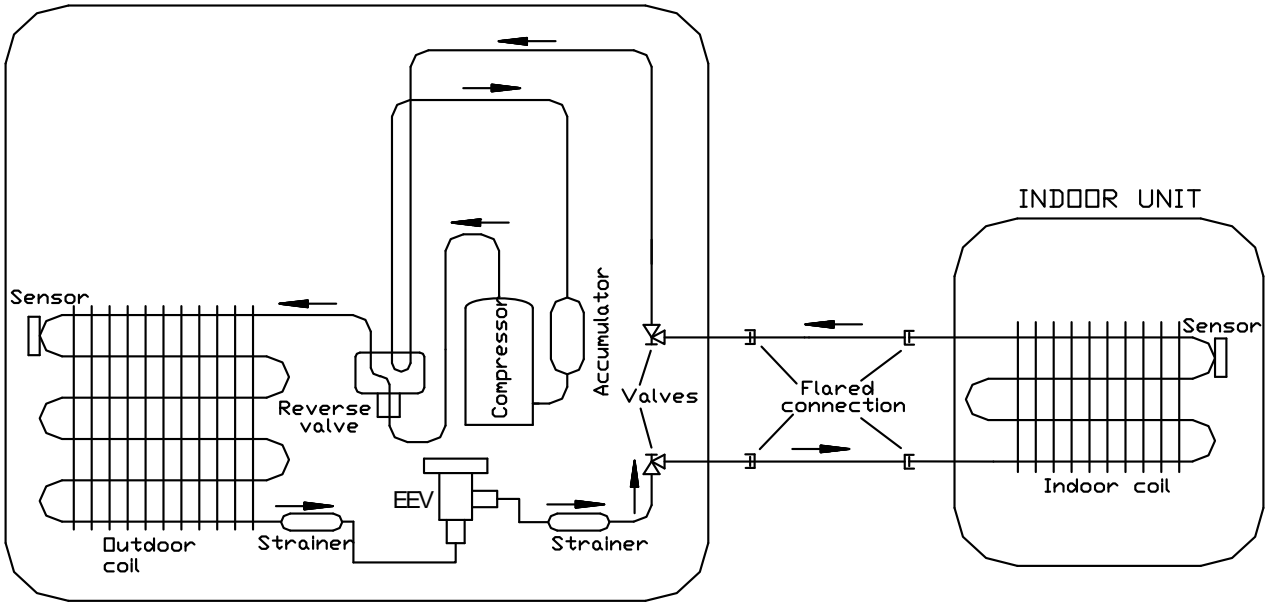
8.5 Outdoor Unit: GC 24 Z DCI



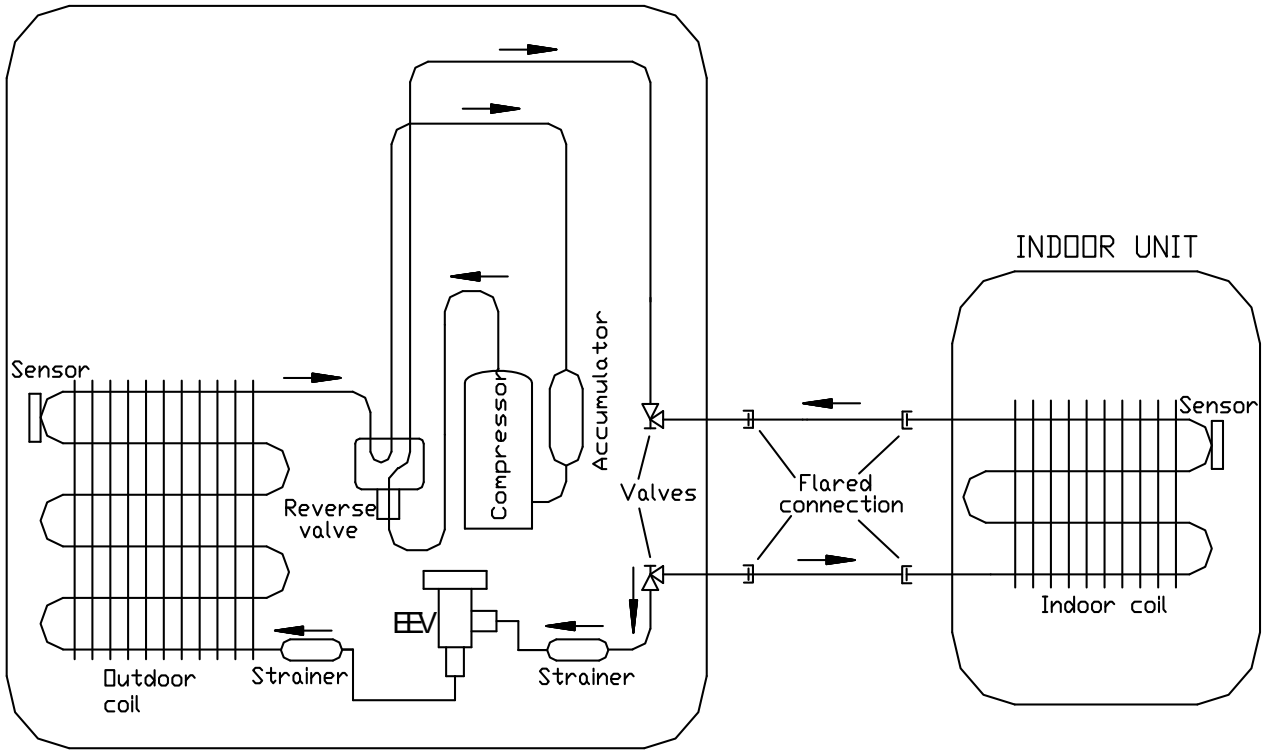
9. REFRIGERATION DIAGRAMS

9.1 Heat Pump Models

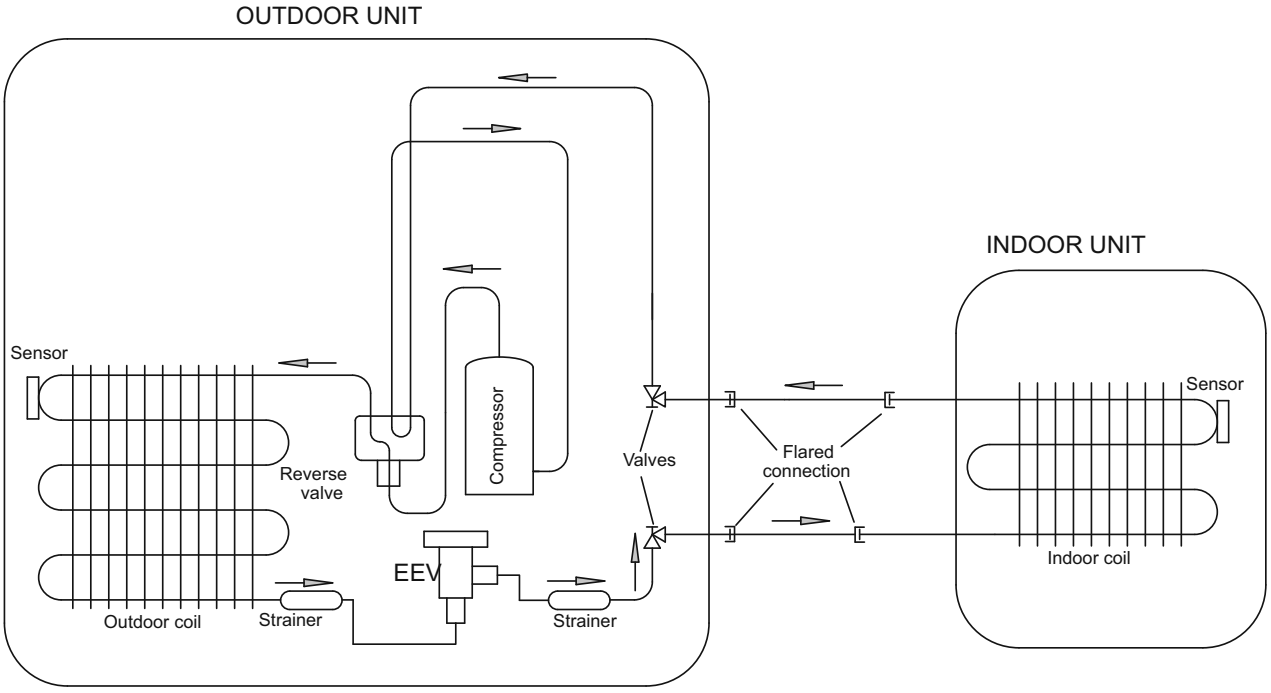
9.1.1 PNX 9, 12, 18, 21 / GC 9, 12, 18, 21 DCI Cooling Mode



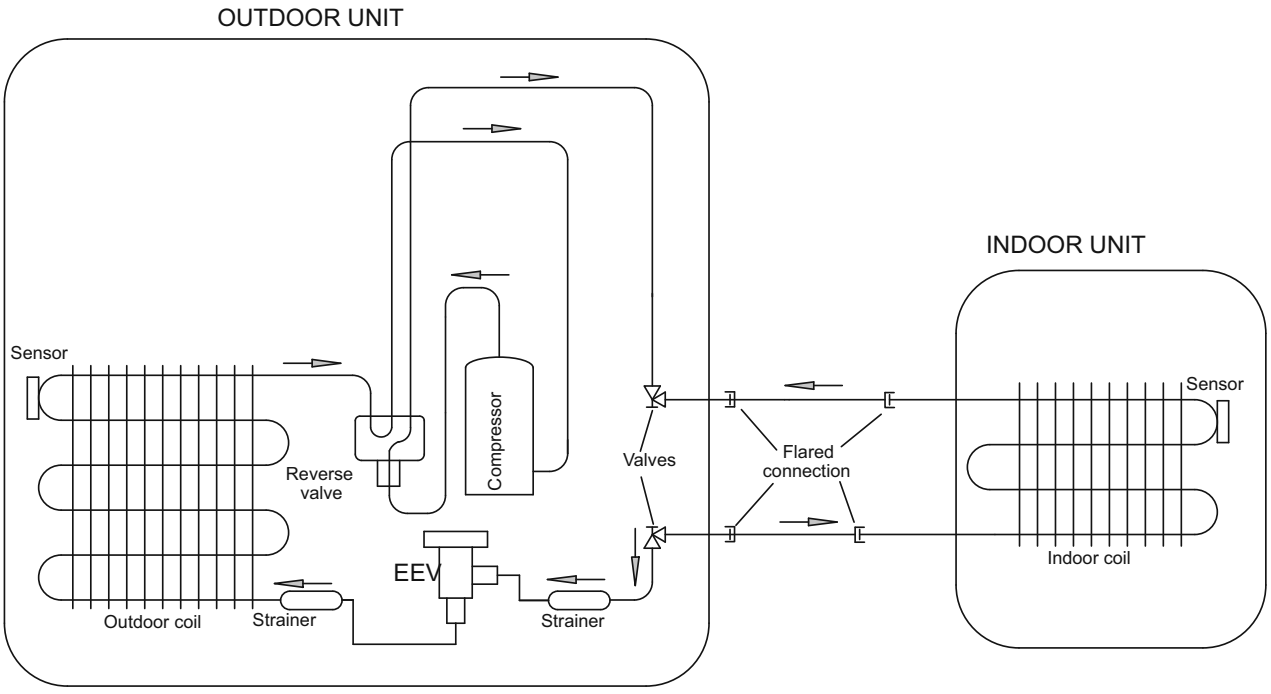
9.1.2 PNX 9, 12, 18, 21 / GC 9, 12, 18, 21 DCI Heating Mode



9.1.3 PNX 24 / GC 24 Z DCI



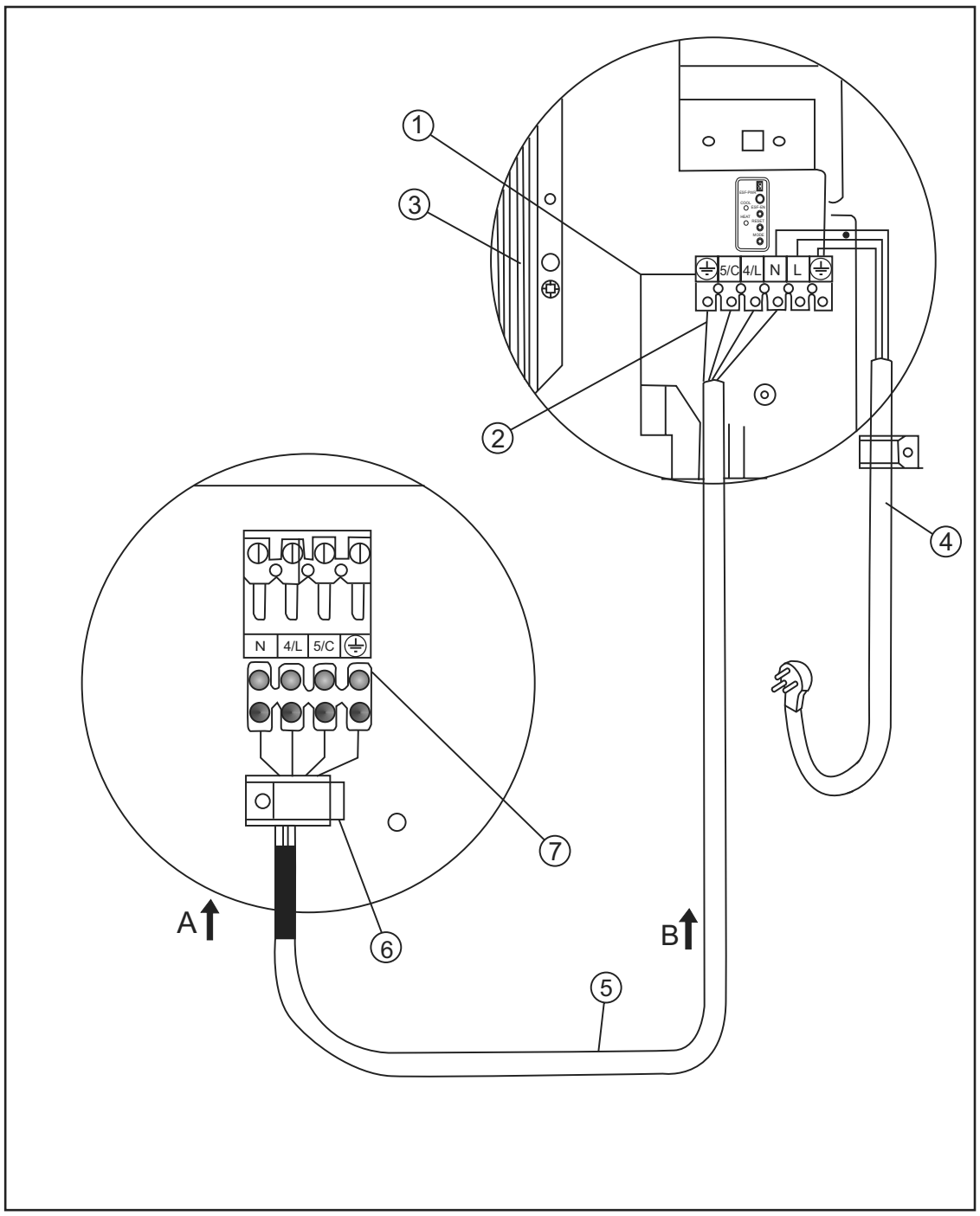
COOLING & DRY MODE



HEATING MODE

10. ELECTRICAL CONNECTIONS

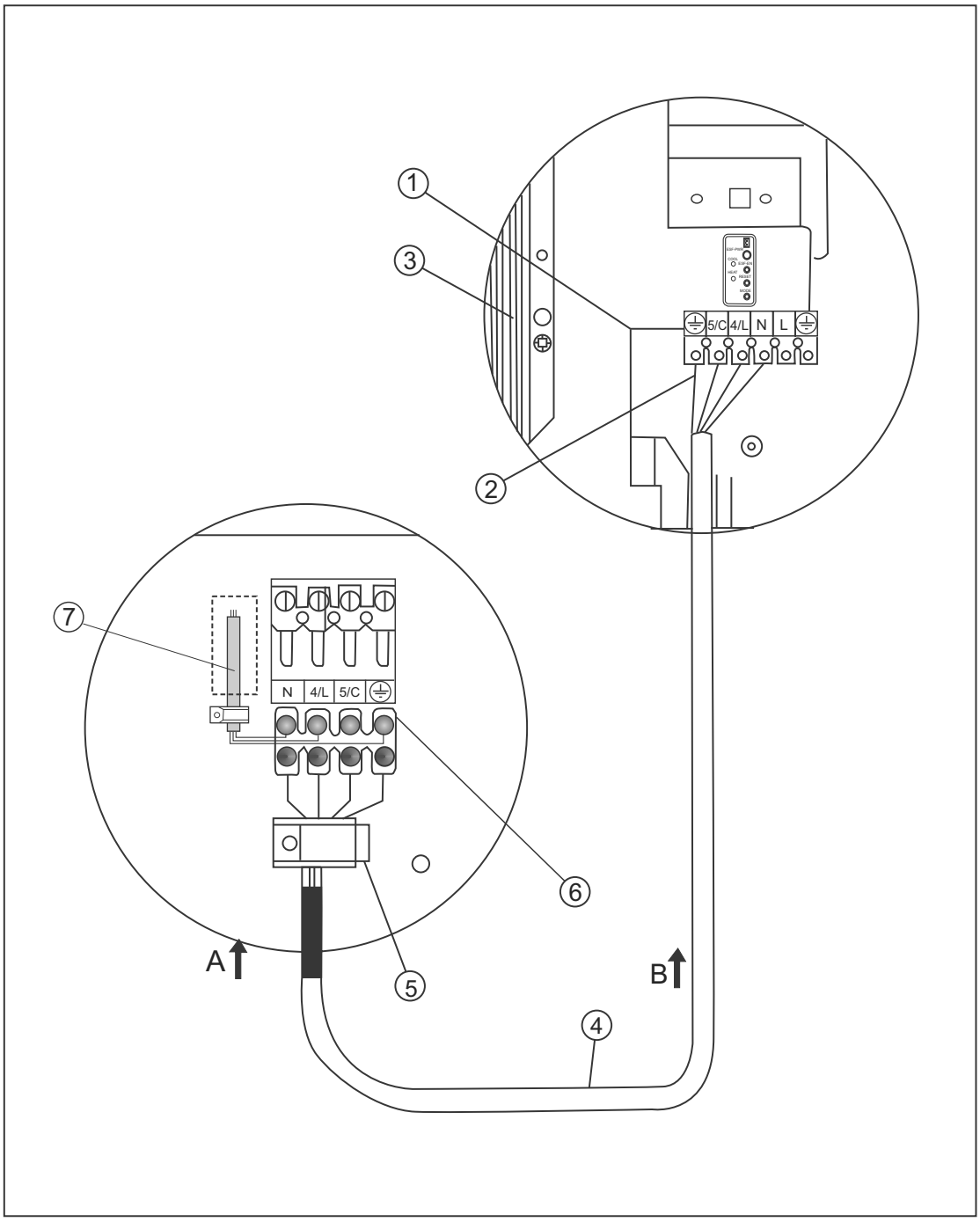
10.1 PNX 9, 12, 18, 21 DCI



1. Indoor unit terminal
2. Ground wire.
3. Indoor coil.
4. Power cable in the indoor side.
5. Multiple wire cable.
6. Cable clamp.
7. Outdoor unit wire terminal.

A. OUTDOOR B. INDOOR

10.2 PNX 24 DCI



1. Indoor unit terminal
2. Ground wire.
3. Indoor coil.
4. Multiple wire cable.

A. OUTDOOR B. INDOOR

5. Cable clamp.
6. Outdoor unit wire terminal.
7. Power cable in the outdoor side (only for outdoor unit power supply)

11. CONTROL SYSTEM for PNX 9 / 12

11.1 General Functions and Operating Rules

The DCI software is fully parametric.
All the model dependent parameters are shown in Blue color and with Italic style [*parameter*].
The parameters values are given in the last section of this control logic chapter of the service manual.

11.1.1 System Operation Concept

The control function is divided between indoor and outdoor unit controllers. Indoor unit is the System 'Master', requesting the outdoor unit for cooling/heating capacity supply. The outdoor unit is the system 'Slave' and it must supply the required capacity nless it enters into a protection mode avoiding it from supplying the requested capacity.
The capacity request is transferred via indoor to outdoor communication, and is represented by a parameter called 'NLOAD'. NLOAD is an integer number with values between 0 and 127, and it represents the heat or cool load felt by the indoor unit.

11.1.2 Compressor Frequency Control

11.1.2.1 NLOAD setting

The NLOAD setting is done by the indoor unit controller, based on a PI control scheme.
The actual NLOAD to be sent to the outdoor unit controller is based on the preliminary LOAD calculation, the indoor fan speed, and the power shedding function.

NLOAD limits as a function of indoor fan speed:

Indoor Fan Speed	Maximum NLOAD Cooling	Maximum NLOAD Heating
Low	*Max NLOADIF1C*	127
Medium	*Max NLOADIF2C*	127
High	*Max NLOADIF3C*	127
Turbo	*Max NLOADIF4C*	127
Auto	*Max NLOADIF5C*	127

NLOAD limits as a function of power shedding:

Mode	Power Shedding OFF	Power Shedding ON
Cool	No limit	Nominal Cooling
Heat	No limit	Nominal Heating

11.1.3 Target Frequency Setting

The compressor target frequency is a function of the NLOAD number sent from the indoor controller and the outdoor air temperature.
Basic Target Frequency Setting:

NLOAD	Target Frequency
127	*Maximum frequency*
10 < NLOAD < 127	Interpolated value between minimum and maximum frequency
10	*Minimum frequency*
0	Compressor is stopped

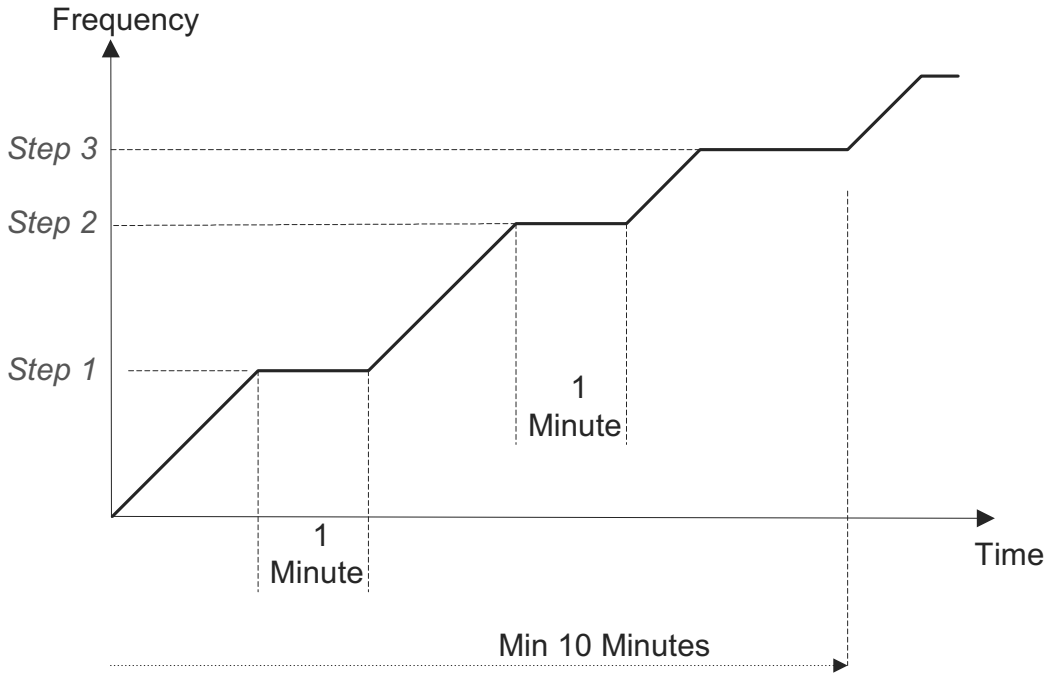
Target frequency limits as a function of outdoor air temperature)OAT(:

OAT Range	Cool mode limits	Heat mode limits
OAT < 6	*MaxFreqAsOATC*	No limit
6 ≤ OAT < 15		*MaxFreqAsOAT1H*
15 ≤ OAT < 24		*MaxFreqAsOAT2H*
24 ≤ OAT	No limit	

11.1.4 Frequency Changes Control

Frequency change rate is 1 Hz/sec.

11.1.5 Compressor Starting Control



11.1.6 Minimum On and Off Time

3 minutes.

11.1.7 Indoor Fan Control

10 Indoor fan speeds are determined for each model. 5 speeds for cool/dry/fan modes and 5 speeds for heat mode.
When user sets the indoor fan speed to a fixed speed)Low/ Medium/ High(, unit will operate constantly at set speed.
When Auto Fan is selected, indoor unit controller can operate in all speeds. The actual speed is set according to the cool/heat load.

11.1.7.1 Turbo Speed

The Turbo speed is activated during the first 30 minutes of unit operation when auto fan speed is selected and under the following conditions:
Difference between set point and actual room temperature is bigger then 3 degrees.
Room temperature > 22 for cooling, or < 25 for heating.

11.1.8 Heating Element Control

Heating element can be started if LOAD > 0.8* MaximumNLOAD AND Indoor Coil temperature <45.
The heating element will be stopped when LOAD < 0.5* MaximumNLOAD OR if Indoor Coil Temperature > 50.

11.1.9 Outdoor Fan Control

7 outdoor fan speeds are determined for each model. 3 speeds for cool and dry modes, and 3 speeds for heat mode, and a very low speed.
Outdoor fan speed is a function of compressor frequency and outdoor air temperature (OAT).
4 routines for fan control are determined. The control routine selection depends on operation mode, compressor speed, outdoor air temperature (OAT) and heat sink temperature (HST).

Routine	Conditions
A	Heating with OAT < 15^0C or Cooling with OAT > 20^0C, or HST > 50^0C or Faulty OAT
B	Cooling with 20^0C > OAT > 50^0C
C	Cooling with 7^0C > OAT
D	Heating with OAT > 15^0C

	Outdoor Fan Speed			
Compressor Frequency (CF)	Routine A	Routine B	Routine C	Routine D
CF= 0	OFF	OFF	OFF	OFF
10 ≤ CF < *OFLowFreq*	Low	Low	Very Low	Low
10 ≤ CF < *OFMedFreq*	Medium	Low	Very Low	Low
OFMedFreq ≤ CF	High	Low	Low	Medium

When compressor is switched to OFF and the heat sink temperature is above 55 degrees, the outdoor fan will remain ON in low speed for up to 3 minutes.

11.1.10 EEV (electronic Expansion valve) Control

EEV opening is defined as EEV = EEV_{OL} + EEV_{CV}
EEV_{OL} is the initial EEV opening as a function of the compressor frequency, operation mode, unit model and capacity.
EEV_{CV} is a correction value for the EEV opening that is based on the compressor temperature.
During the first 10 minutes of compressor operation EEV_{CV} = 0.
Once the first 10 minutes are over, the correction value is calculated as follow: $EEV_{CV}(n)$ = $EEV_{CV}(N-1)$ + EEV_{CTT}
EEV_{CTT} is the correction based on the compressor temperature. A target compressor temperature is set depending on frequency and outdoor air temperature, and the actual compressor temperature is compared to the target temperature to set the required correction to the EEV opening.

11.1.11 Reversing Valve (RV) Control

Reversing valve is on in heat mode.
Switching of RV state is done only after compressor is off for over 3 minutes.

11.1.12 Ioniser Control

Ioniser is on when unit is on AND indoor fan is on AND Ioniser power switch (on Ioniser) is on.

11.1.13 Electro Static Filter)ESF(Control

ESF is on when ESF switch is on, Safety switch is pressed, unit is on, AND indoor fan is on.

11.1.14 Base Heater Control

When OAT is connected, Base Heater will be on when unit is in heating and OAT<2^{0}C.
When OAT is disconnected, Base Heater will be on when unit is in heating.

11.2 Fan Mode

In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusting automatically according to the difference between actual room temperature and user set point temperature.

11.3 Cool Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be ad8usted automatically according to the calculated NLOAD.

11.4 Heat Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adng to the calculated
NLOAD.

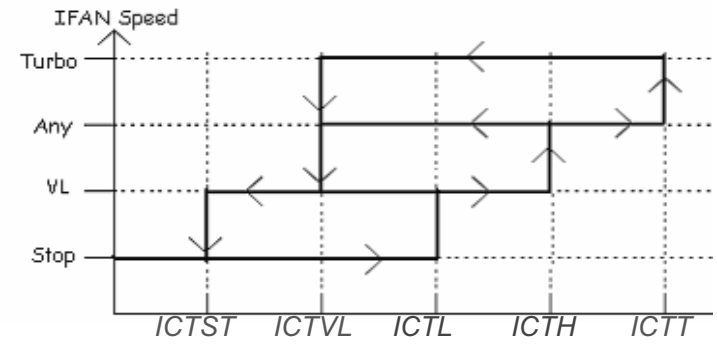
11.4.1 Temperature Compensation

In wall mounted, ducted, and cassette models, 3 degrees are reduced from room temperature reading (except when in I-Feel mode), to compensate for temperature difference between high and low areas in the heated room, and for coil heat radiation on room thermistor.
The temperature compensation can be enabled/disabled by shortening of J2 on the indoor unit controller.

Model	J2 Shorted	J2 Opened
Wall mounted	Compensation Disabled	Compensation Enabled
Cassette	Compensation Enabled	Compensation Disabled
Ducted	Compensation Enabled	Compensation Disabled
Floor/Ceiling	Compensation Disabled	Compensation Enabled

11.4.2 Indoor Fan Control in Heat Mode

Indoor fan speed depends on the indoor coil temperature:



11.5 Auto Cool/Heat Mode

When in auto cool heat mode unit will automatically select between cool and heat mode according to the difference between actual room temperature and user set point temperature)ΔT(.
Unit will switch from cool to heat when compressor is off for 3 minutes, and ΔT < -3.
Unit will switch from heat to cool when compressor is off for 5 minutes, and ΔT < -3.

11.6 Dry Mode

As long as room temperature is higher then the set point, indoor fan will work in low speed and compressor will work between 0 and *MaxNLOADIF1C* Hz.
When the room temperature is lower than the set point, compressor will be switched OFF and indoor fan will cycle 3 minutes OFF, 1 minute ON.

11.7 Protections

There are 5 protection codes.
Normal (Norm) – unit operate normally.
Stop Rise (SR) – compressor frequency can not be raised but does not have to be decreased.
HzDown1 (D1) – Compressor frequency is reduced by 2 to 5 Hz per minute.
HzDown2 (D2) – Compressor frequency is reduced by 5 to 10 Hz per minute.
Stop Compressor (SC) – Compressor is stopped.

11.7.1 Indoor Coil Defrost Protection

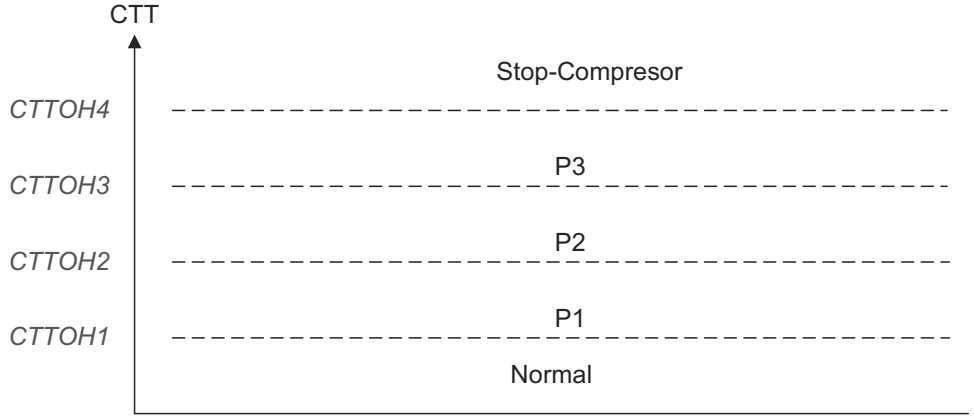
ICT	ICT Trend				
	Fast Increasing	Increasing	No change	Decreasing	Fast Decreasing
ICT < -2	SC	SC	SC	SC	SC
-2 ≤ ICT < 0	D1	D1	D2	D2	D2
0 ≤ ICT < 2	SR	SR	D1	D2	D2
2 ≤ ICT < 4	SR	SR	SR	D1	D2
4 ≤ ICT < 6	Norm	Norm	SR	SR	D1
6 ≤ ICT < 8	Norm	Norm	Norm	SR	SR
8 ≤ ICT	Normal				

11.7.2 Indoor Coil over Heating Protection

ICT	ICT Trend				
	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
ICT> 55	SC	SC	SC	SC	SC
53 <ICT ≤ 55	D1	D1	D2	D2	D2
49 < ICT ≤ 53	SR	SR	D1	D2	D2
47 < ICT ≤ 49	SR	SR	SR	D1	D2
45 < ICT ≤ 47	Norm	Norm	SR	SR	D1
43 < ICT ≤ 45	Norm	Norm	Norm	SR	SR
ICT ≤ 43	Normal				

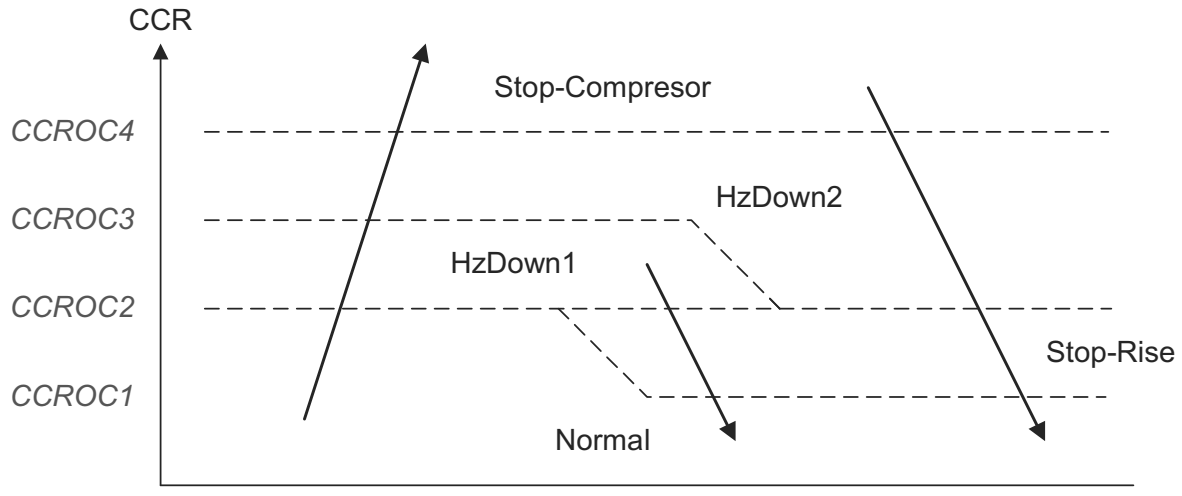
11.7.3 Compressor over Heating Protection

Compressor temperature can be in one of 5 control zones)4 in protection, and 1 normal(, according to the following chart.



Control Status	Compressor Temperature Increases	Else
P1	Norm	SR
P2	D1	SR
P3	D2	D1
Stop Compressor	SC	

11.7.4 Compressor over Current Protection



11.7.5 Heat Sink Over Heating Protection (NA for GC 9 and GC 12 DCI)

HST	HST Trend		
	Decreasing	No Change	Increasing
HST > 90	SC	SC	SC
85 < HST ≤ 90	D1	D2	D2
82 < HST ≤ 85	SR	D1	D2
80 < HST ≤ 82	SR	SR	D1
78 < HST ≤ 80	Norm	Norm	SR
HST ≤ 78	Normal		

11.7.6 Outdoor Coil Deicing Protection

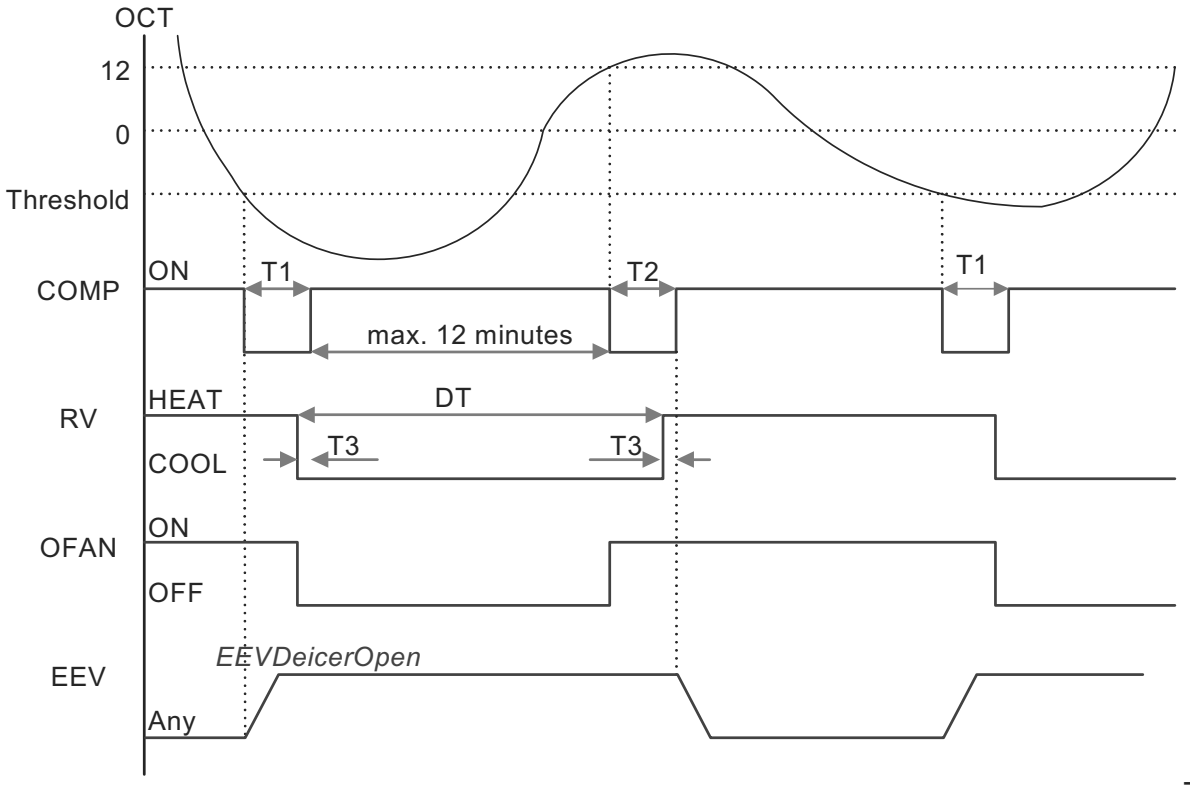
11.7.6.1 Deicing Starting Conditions

Deicing operation will start when either one of the following conditions exist:
Case 1: OCT < OAT – 8 AND TLD > DI
Case 2: OCT < OAT – 12 AND TLD > 30 minutes.
Case 3: OCT is Invalid AND TLD > DI
Case 4: Unit is just switched to STBY AND OCT < OAT - 8
Case 5: NLOAD = 0 AND OCT < OAT -8

OCT – Outdoor Coil Temperature
OAT – Outdoor Air Temperature
TLD – Time from Last Deicing
DI – Deicing Interval (Time Interval Between Two Deicing)

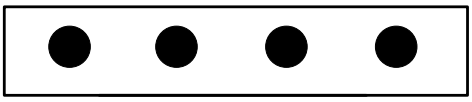
Deicing interval time when compressor is first started in heat mode, is 10 minutes if OCT < -2, and is 40 minutes in other cases.
Deicing interval time is changed (increased/ decreased in 10 minutes steps) as a function of deicing time. If deicing time is shorter then former deicing time, the deicing interval time will be increased. If deicing time is longer then former deicing time, the deicing interval time will be decreased.

11.7.6.2 Deicing Protection Procedure



36 seconds, T3 = 6 seconds

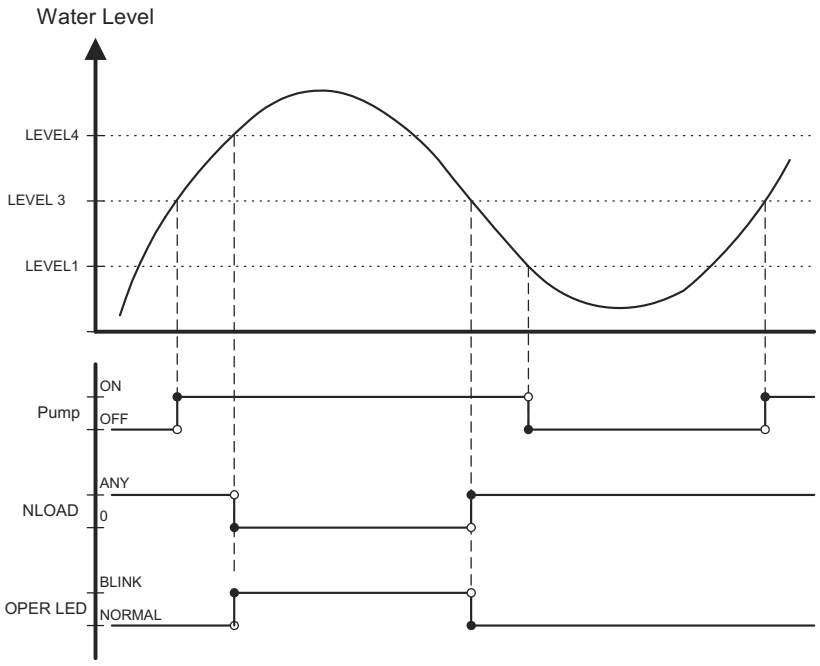
11.8 Condensate Water Over Flow Protection



Each of the pins P1, P2, P3 can have two options:
1 – When it is shorted with P4
0 – When it is not shorted to P4

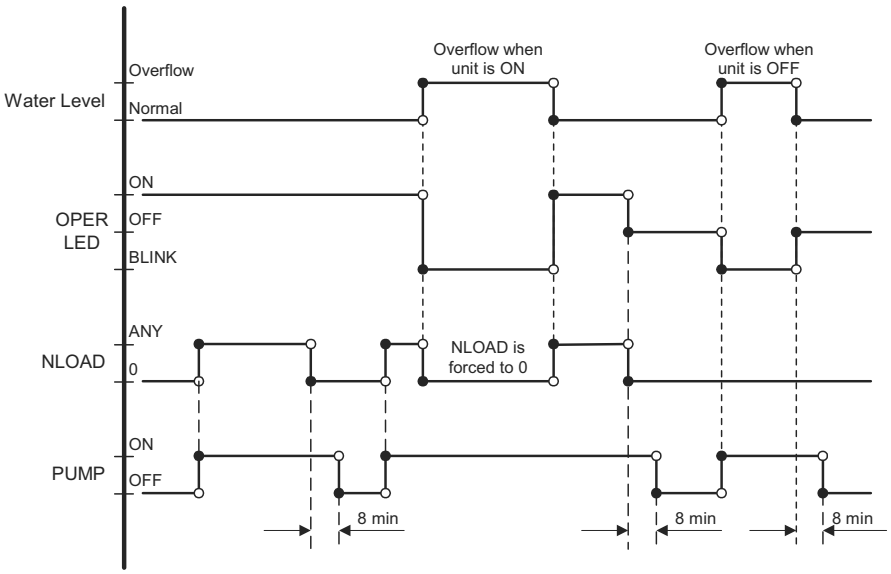
11.8.1 3 Levels Logic (used in floor/ceiling models)

P2	P3	Level
0	0	L0
1	0	L1
1	1	L2&3
0	1	L4



11.8.2 1 Level Logic (used in all models except for floor/ceiling models)

P2	P3	Level
Don`t care	1	Normal
Don`t care	0	Overflow



11.9 Indoor Unit Dry Contact

Indoor unit Dry contact has two alternative functions that are selected by J8.

	Function	Contact = Open	Contact = Short
J8 = Open	Presence Detector Connection	No Limit	Forced to STBY
J8 = Open	Power Shedding Function	No Limit	Limit NLOAD

11.10 Operating the Unit from the Mode Button

Forced operation allows to start, stop and operate in Cooling or Heating, in pre-set temperature according to the following table:

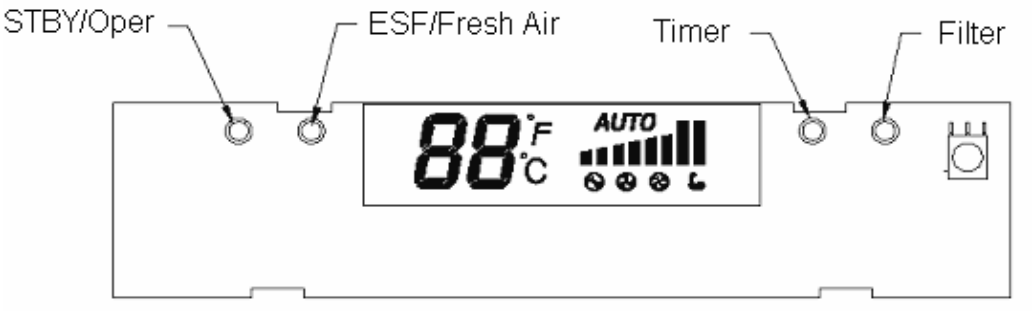
Forced operation Mode	Pre-set Temperature
Cooling	20^0C
Heating	28^0C

11.11 On Unit Controls and Indicators

11.11.1 Indoor Unit Controller Controls and Indicators For All Models Except for Floor/Ceiling model

STAND BY INDICATOR	Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands
OPERATION INDICATOR	Lights up during operation. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	Lights up when Air Filter needs to be cleaned.
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch on the unit.
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch on the unit.
Mode SWITCH (COOL/HEAT/OFF)	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → In long pressing system enters diagnostic mode.
RESET / FILTER SWITCH	For short pressing: When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled. When Filter LED is off able/disable the buzzer announcer, if selected.

11.11.2 Indoor Unit Controls and Indicators for LCD Display



	STBY	Cool	Heat	Auto	Fan	Dry
88	OFF	SPT(1*)	SPT(1*)	SPT(1*)	SPT(1*)	SPT(1*)
C	OFF(2*)	ON(2*)	ON(2*)	ON(2*)	ON(2*)	ON(2*)
F	OFF(2*)	OFF(2*)	OFF(2*)	OFF(2*)	OFF(2*)	OFF(2*)
(Low)	OFF	User setting IFAN speed	User setting IFAN speed	User setting IFAN speed	User setting IFAN speed	User setting IFAN speed
(Med)	OFF					
(High)	OFF					
(Turbo)	OFF					
AUTO (Auto)	OFF					
Backlight(red)	OFF	OFF	ON(3*)	ON(3*)	ON(3*)	OFF
Backlight(green)	OFF	ON(3*)	OFF	ON(3*)	ON(3*)	ON(3*)

11.11.3 Indoor Unit Controller Controls and Indicators for Floor/Ceiling Model

STANDBY INDICATOR	Lights up when the Air Conditioner is connected to power and is ready for operation
OPERATE INDICATOR (4)	1. Lights up during operation. 2. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. 3. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	1. Lights up when Air Filter needs to be cleaned. 2. Blinks during Water Over Flow in PXD models. (Cf. Sect. 7.3)
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch on the unit.
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch on the unit.
FAN MODE INDICATOR (4)	Lights up in Fan Mode activated by local switches.
FAN SPEED INDICATORS	L -- Lights up when IFAN setting is Low. M -- Lights up when IFAN setting is Medium. H -- Lights up when IFAN setting is High. A -- Lights up when IFAN setting is Auto.
TEMP. SETTING INDICATORS	Each one of the seven indicators indicates the following SPT: 18, 20, 22, 24, 26, 28, 30]°c[. The odd number temperatures are indicated by turning on the two adcent indicators.
FAN SPEED BUTTON	Press this button to change the speed of the IFAN. Each pressing change the speed in the sequence of: ..... L → M → H → Auto → L → ...
TEMP. SETTING UP BUTTON	Pressing this button increases the SPT by 1°C. Note: The Max SPT is 30°C.
TEMP. SETTING DOWN BUTTON	Pressing this button decreases the SPT by 1°C. Note: The Min SPT is 18°C.
MODE BUTTON	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → In long pressing system enters diagnostic mode.
POWER BUTTON	Toggle the unit between OPER & STBY modes.
RESET / FILTER BUTTON	For short pressing: When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled. When Filter LED is off able/disable the buzzer announcer, if selected. In long pressing system enters set up mode (if in SB).

11.11.4 Outdoor Unit Controller Indicators

Unit has three LED
SB LED is ON when power is ON (230 VAC, even when no communication).
STATUS LED is ON when COMP is ON, and Blinks according to diagnostics mode definitions when either fault or protection occurs.
FAULT LED Blinks according to diagnostics mode definitions when either fault or protection occurs.

11.12 Jumper Setting

11.12.1 Indoor Unit Controller

0 = Open Jumper (disconnect jumper).
1 = Close Jumper (connect jumper).
Self test Jumper – J1

OPERATION	J1
SELF-TEST	1
NORMAL	0

Compensation Jumper – J2

Model	J2 (Default)	Compensation
Wall Mounted	0	Activated
Floor/Ceiling	1	Deactivated
Ducted/cassette	1	Activated

Family selection Jumper – J3, J4 and J5

Family	J5	J4	J3
Reserved	0	0	0
Reserved	0	0	1
Reserved	0	1	0
Wall Mounted (WNG/FLO)	0	1	1
Floor/Ceiling (PXD)	1	0	0
Reserved	1	0	1
Ducted (LS)	1	1	0
Cassette (K)	1	1	1

IDU Model	Jumper Setting					
	J8	J7	J6	J5	J4	J3
FLO 9	0	0	0	0	1	1
FLO 12	0	1	0	0	1	1
FLO 18	0	0	1	0	0	0
FLO 28	0	0	1	0	0	1
SX 9	0	0	0	1	0	0
SX 12	0	1	0	1	0	0
SX 18	1	0	0	1	0	0
K 9	0	0	0	1	1	1
K 12	0	1	0	1	1	1
K 18	1	0	0	1	1	1
LS12	0	1	0	1	1	0

For wall mounted units Jumpers j7, j8 can be configured by service. All other jumpers on the above table are factory default (cannot be changed by service).
For unit types as Cassettes, floor ceiling, and ducted, jumpers are set by a model plug.

Model selection Jumper – J7, J8

Model	J8	J7
A	0	0
B	0	1
C	1	0
D	1	1

J9- Presence Detector/Power Shedding

OPERATION	J9
Presence Detector	0
Power Shedding	1

Jumper – J10

OPERATION	J10
WNG DCI LCD	0
LED	1

11.12.2 Outdoor Unit Controller

JP9 JUMPER LAYOUT

Reserved *(PIN 9)*	**ODU3** *(PIN 7)*	**ODU2** *(PIN 5)*	**ODU1** *(PIN 3)*	**ODU0** *(PIN 1)*
GND *(PIN 10)*	**GND** *(PIN 8)*	**GND** *(PIN 6)*	**GND** *(PIN 4)*	**GND** *(PIN 2)*

ODU MODEL SELECTION

ODU3	ODU2	ODU1	ODU0	ODU Model
OFF	OFF	OFF	OFF	Reserved
OFF	OFF	OFF	ON (PIN1 & PIN2)	A (DCI 25)
OFF	OFF	ON (PIN3 & PIN4)	OFF	B (DCI 35)
OFF	OFF	ON (PIN3 & PIN4)	ON (PIN1 & PIN2)	C (DCI 50)
OFF	ON (PIN5 & PIN6)	OFF	OFF	D
OFF	ON (PIN5 & PIN6)	OFF	ON (PIN1 & PIN2)	E (Duo)
OFF	ON (PIN5 & PIN6)	ON (PIN3 & PIN4)	OFF	F
OFF	ON (PIN5 & PIN6)	ON (PIN3 & PIN4)	ON (PIN1 & PIN2)	G
ON (PIN7 & PIN8)	OFF	OFF	OFF	H
ON (PIN7 & PIN8)	OFF	OFF	ON (PIN1 & PIN2)	I
ON (PIN7 & PIN8)	OFF	ON (PIN3 & PIN4)	OFF	J
ON (PIN7 & PIN8)	OFF	ON (PIN3 & PIN4)	ON (PIN1 & PIN2)	K
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	OFF	OFF	L
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	OFF	ON (PIN1 & PIN2)	M
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	ON (PIN3 & PIN4)	OFF	N
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	ON (PIN3 ? PIN4)	ON (PIN1 & PIN2)	O

11.13 Test Mode

11.13.1 Entering Test Mode

System can enter Test mode in two ways:
Automatically when the following conditions exists for 30 minutes continuously:
Mode = Cool, Set point =16, Room temperature = 27±1, Outdoor temperature = 35±1
Or
Mode = Heat, Set point = 30, Room temperature = 20±1, Outdoor temperature = 7±1
Manually when entering diagnostics with the following settings:
Mode = Cool, Set point = 16
Mode = Heat, Set point = 30

11.13.2 Unit Operation in Test Mode

In test mode, the unit will operate in fixed settings according to the indoor fan speed setting:

Indoor Fan Speed Setting	Unit Setting
Low	Minimum Capacity Setting
High	Nominal Capacity Setting
Auto	Maximum Capacity Setting

During test mode, protections are disabled, except for stop compressor status.

11.14 SW Parameters

11.14.1 Indoor Units SW Parameters

General Parameters for All Models:

Parameters defining the indoor fan speed as a function of Indoor Coil temperature in heat mode (ICT):

ICTST Speed	ICT to stop indoor fan	25
ICTVLSpeed	ICT to go down to very low speed	28
ICTLSpeed	ICT to start in very low speed	30
ICTHSpeed	ICT to start in increase speed from very low	32
ICTTSpeed	ICT to enable Turbo fan speed	40

Model Depended Parameters:

Parameter name	Wall Mounted Models	
	DCI 9	DCI 12
NLOAD limits as a function of selected indoor fan speed		
MaxNLOADIF1C	40	40
MaxNLOADIF2C	53	53
MaxNLOADIF3C	120	120
MaxNLOADIF4C	127	127
MaxNLOADIF5C	127	127
Indoor Fan speeds		
IFVLOWC	700	700
IFLOWC	800	800
IFMEDC	900	950
IFHIGHC	1050	1100
IFTURBOC	1150	1200
IFVLOWH	700	700
IFLOWH	800	850
IFMEDH	950	1000
IFHIGHH	1100	1150
IFTURBOH	1200	1250
Nominal Compressor Frequency		
NomLoadC	40	62
NomLoadH	55	67

Parameter Name	Cassette Models			
	K 9	K 12	K 12S	K18
NLOAD limits as a function of selected indoor fan speed				
MaxNLOADIF1C	40	40	40	40
MaxNLOADIF2C	53	56	56	60
MaxNLOADIF3C	120	90	90	90
MaxNLOADIF4C	127	90	90	90
MaxNLOADIF5C	127	90	90	90
Nominal Compressor Frequency				
NomLoadC	40	60	56	63
NomLoadH	55	69	73	80

11.14.2 Outdoor Units SW Parameters

Parameter Name	DCI 9	DCI 12	DCI 18	DCI 50 DUO
Compressor Parameters				
MinFreqC	30	33	20	20
MaxFreqC	64	80	85	97
MinFreqH	30	35	20	26
MaxFreqH	81	93	99	106
Step1Freq	60	60	60	60
Step2Freq	70	70	70	80
Step3Freq	90	90	90	90
Frequency limits as a function of outdoor air temperature				
MaxFreqAsOATC	50	50	64	62
MaxFreqAsOAT1H	65	75	85	85
MaxFreqAsOAT2H	60	60	60	60
Compressor Over Heating Protection				
CTTOH1	94	94	94	90
CTTOH2	98	98	98	95
CTTOH3	102	102	102	102
CTTOH4	105	105	105	105
Compressor Over Current Protection [A]				
CCR01	7.1	7.1	10	10
CCR02	7.5	7.5	10.5	10.5
CCR03	7.9	7.9	10.8	10.8
CCR04	8.3	8.3	11.2	11.2
Outdoor Fan Speed (RPM)				
VL	200	200	200	200
OFLOWC	550	550	600	600
OFMEDC	700	700	760	830
OFMAXC	830	830	920	920
OFLOWH	550	550	600	600
OFMEDH	700	700	830	920
OFMAXH	830	830	1000	1000
Outdoor Fan Limit Control				
OFLowFreq	45	45	40	40
OFMedFreq	57	57	70	70

12. CONTROL SYSTEM for PNX 18 / 21 / 24

12.1 General Functions and Operating Rules

The DCI software is fully parametric.
All the model dependent parameters are shown in Blue color and with Italic style [*parameter*].
The parameters values are given in the last section of this control logic chapter of the service manual.

12.1.1 System Operation Concept

The control function is divided between indoor and outdoor unit controllers. Indoor unit is the system 'Master', requesting the outdoor unit for cooling/heating capacity supply. The outdoor unit is the system 'Slave' and it must supply the required capacity unless it enters into a protection mode avoiding it from supplying the requested capacity.
The capacity request is transferred via indoor to outdoor communication, and is represented by aparameter called 'NLOAD'. NLOAD is an integer number with values between 0 and 127, and it represents the heat or cool load felt by the indoor unit.

12.1.2 Compressor Frequency Control

12.1.2.1 NLOAD setting

The NLOAD setting is done by the indoor unit controller, based on a PI control scheme.
The actual NLOAD to be sent to the outdoor unit controller is based on the preliminary LOADcalculation, the indoor fan speed, and the power shedding function.
NLOAD limits as a function of indoor fan speed:

Indoor Fan Speed Maximum NLOAD Cooling Maximum NLOAD Heating

Indoor Fan Speed	Maxium NLOAD Cooling	Maxium NLOAD Heating
Low	*MaxNLOADIF1C*	*MaxNLOADIF1H*
Medium	*MaxNLOADIF2C*	*MaxNLOADIF2H*
High	*MaxNLOADIF3C*	*MaxNLOADIF3H*
Turbo	*MaxNLOADIF4C*	*MaxNLOADIF4H*
Auto	*MaxNLOADIF5C*	*MaxNLOADIF5H*

NLOAD limits as a function of power shedding:

Mode	Power Shedding OFF	Power Shedding ON
Cooling	No limit	Nominal Cooling
Heating	No limit	Nominal heating

12.1.3 Target Frequency Setting

12.1.3.1 Target Frequency Setting for GC 18 / 21 / 24 Z

The compressor target frequency is a function of the NLOAD number sent from the indoor controller and the outdoor air temperature.

Basic Target Frequency Setting:

NLOAD	Target Frequency
127	*Maximum Frequency*
10<NLOAD<127	Interpolated value between minimum and maximum frequency
10	Minimum frequency
0	Compressor is stopped

Target frequency limits as a function of outdoor air temperature (OAT):

OAT Range	Cooling Mode limits	Heating Mode limits
OAT < 6	***MaxFreqAsOATC***	**No limit**
6 ≤ OAT < 15		***MaxFreqAsOAT1H***
15 ≤ OAT < 28		***MaxFreqAsOAT2H***
28≤ OAT	**No limit**	

12.1.3.2 Target Frequency Setting for GC 24 / 30

The compressor Target Speed is calculated according to the following formula:

$$T\arg et\ Speed_{load} = \max\left[MinSpeed, MaxSpeed \cdot \frac{ODUNload}{127} \right]$$

MiniSpeed, MaxSpeed are defined as following:

When the unit is in the cool mode, $MiniSpeedC = 15Hz,\ MaxSpeed = 75Hz$

When the unit is in the heat mode, $MiniSpeedH = 20Hz,\ MaxSpeed = 95Hz$

ODU NLOAD is caculated according to the IDU NLoad:

$$ODU\ NLOAD = \min\left\{ \frac{3 * IDUNLOAD}{ODUCode}, 127 \right\}$$

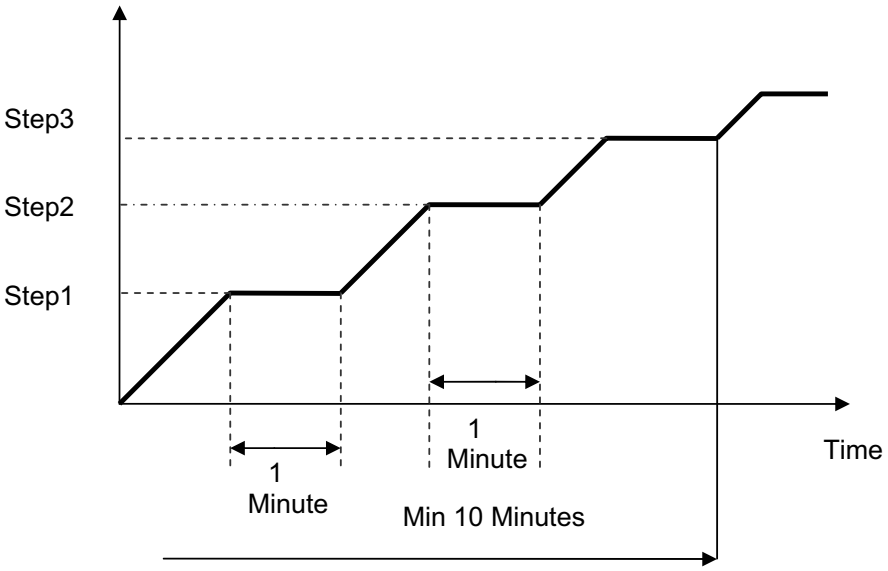
OAT	ODUCodeC	ODUCodeC	IDUNLOAD
≤-5	3	3	Refer to sect.112.1.2.1
≤-5	3.8	3	

12.1.4 Frequency Changes Control

When the unit is running normally , the compressor frequency change rate is 1 Hz/sec.

12.1.5 Compressor Starting Control

12.1.5.1 Compressor starting control for GC 18 / 21 / 24 Z



12.1.5.2 Compressor starting control for GC 24 / 30

Step 1

Whenever the compressor starts up, after it has been off for more than 45 minutes, the compressor frequency cannot go below *Step1RPS* for 3 continuous minutes (*this rule comes to ensure oil return to the compressor*).

Step 2

The compressor speed cannot go above *Step2RPS* once after each compressor start up for 3 continuous minutes (*this rule comes to prevent oil exit from the compressor after its start up)*.

Step 3

The speed cannot go higher than *Step3RPS* unless it was operating for more than 1 continuous minutes between *Step3RPS* – 5 and *Step3RPS* .

After passing above *Step3RPS*, this rule is re-applied when passing below *Step3RPS*-5.

12.1.6 Minimum On and Off Time

3 minutes

12.1.7 Indoor Fan Control

8 Indoor fan speeds are determined for each model. 4 speeds for cool/dry/fan modes and 4 speeds for heat mode.

When user sets the indoor fan speed to a fixed speed (Low/ Medium/ High), unit will operate constantly at set speed.

When Auto Fan is selected, indoor unit controller can operate in all speeds. The actual speed is set according to the cool/heat load.

12.1.7.1 Turbo Speed

The Turbo speed is activated during the first 30 minutes of unit operation when auto fan speed is selected and under the following conditions:

Difference between set point and actual room temperature is bigger then 3 degrees.

Room temperature > 22 for cooling, or < 25 for heating.

12.1.8 Outdoor Fan Control

12.1.8.1 Outdoor Fan Control for GC 18 / 21

7 outdoor fan speeds are determined for each model. 3 speeds for cool and dry modes, and 3 speeds for heat mode, and a very low speed.

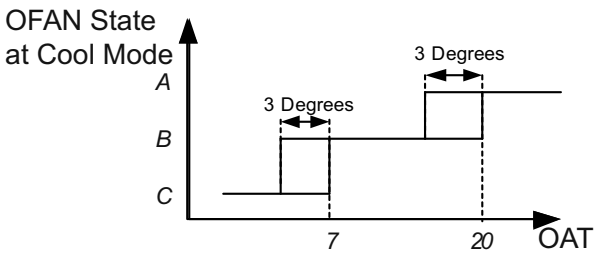
Outdoor fan speed is a function of compressor frequency and outdoor air temperature (OAT).

4 routines for fan control are determined. The control routine selection depends on operation mode, compressor speed, outdoor air temperature (OAT) and heat sink temperature (HST).

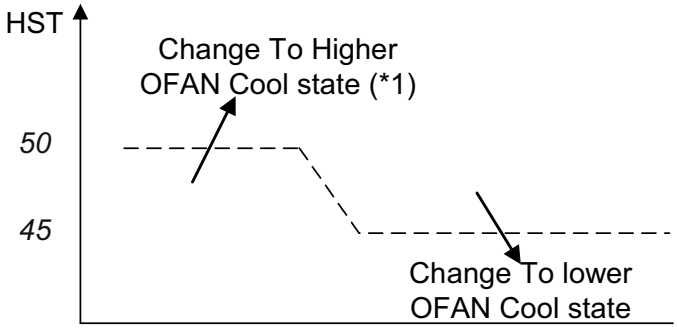
Routine	Conditions
A	Heating with OAT < 15°C or Cooling with OAT > 20°C, or Faulty OAT
B	Cooling with 20°C > OAT > 7°C
C	Cooling with 7°C > OAT
D	Heating with OAT > 15°C

Compressor Target Frequency	OFAN Speed			
	Routin A	Routin B	Routin C	Routin D
Freq=0	OFF	OFF	OFF	OFF
10 ≤ Freq < *OFLowFreq*	Low	Low	VL	Low
OFLowFreq ≤ Freq< *OFMedFreq*	Medium	Low	VL	Low
OFMedFreq≤ Freq	High	Low	Low	Medium

When compressor is switched to OFF and the heat sink temperature is above 55 degrees, the outdoor fan will remain ON in low speed for up to 3 minutes.



Note: Periorities A>B>C



*(*1) If State C, change to B*
If State B, change to A

12.1.8.2 Outdoor Fan Control for GC 24 / 24 Z / 30

OFAN operates between any speed *OFMinRPM* to *OFMaxRPM*.

The fan speed is also related to protections and OMT value.

* For DCI 72Z, in heating mode the OFAN speed is related to OCT.

12.1.9 EEV (Electronic Expansion Vavle) Control

12.1.9.1 EEV Control for DCI50/60

EEV opening is defined as EEV = EEVOL + EEVCV

EEVOL is the initial EEV opening as a function of the compressor frequency, operation mode, unit model and capacity.

EEVCV is a correction value for the EEV opening that is based on the compressor temperature.

During the first 5 minutes of compressor operation EEVCV = 0.

Once the first 5 minutes are over, the correction value is calculated as follow: EEVCV(n) = EEVCV(n-1) + EEVCTT

EEVCTT is the correction based on the compressor temperature. A target compressor temperature is set depending on frequency and outdoor air temperature, and the actual compressor temperature is compared to the target temperature to set the required correction to the EEV opening.

12.1.9.2 EEV Control for GC 24 / 24 Z / 30

The target EEV value is the sum of open loop value (OL) and a result of the accumulative correction values (CV).

$$EEV = EEV_{OL} + \sum EEV_{CV}$$

The EEV intial value(OL) is defined as follow:

EEV_{OL}= *EEVBaseOpenLoop* + *EEVOpenLoopCpctyCrct* + *EEVTubeCompnst*

Basic EEV open loop		Open Loop correction	EEV tube Length compensation
Mode	72/80	72/80	72/80
COOL	220	25	0
HEAT	170	30	0

*For DCI72Z

The initial EEV_{OL} is defined in accordance to the compressor frequency

EEV_{CV} is a correction value for the EEV opening that is based on the compressor temperature, During the first 6 minutes after SB the correction is not calculated. After that the correction value is updated every *30* seconds.

12.1.10 RV(Reversing Valve) Control

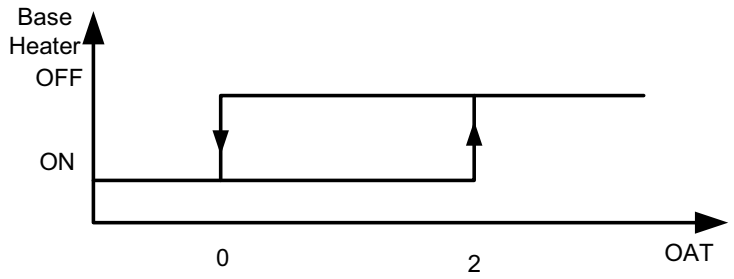
Reversing valve is on in heat mode.
Switching of RV state is done only after compressor is off for over 3 minutes.

12.1.11 Ioniser Control

Ioniser is on when unit is on ,AND indoor fan is on ,AND Ioniser power switch (on Ioniser) is on.

12.1.12 Base Heater Control

The base heater will be working only when RV is “ON” according to the following graph:



When OAT is faulty the base heater will be “ON” continuously in HEAT mode.

12.2 Fan Mode

In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the differencebetween actual room temperature and user set point temperature.

12.3 Cool Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the calculated NLOAD.

12.4 Heat Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the calculated NLOAD.

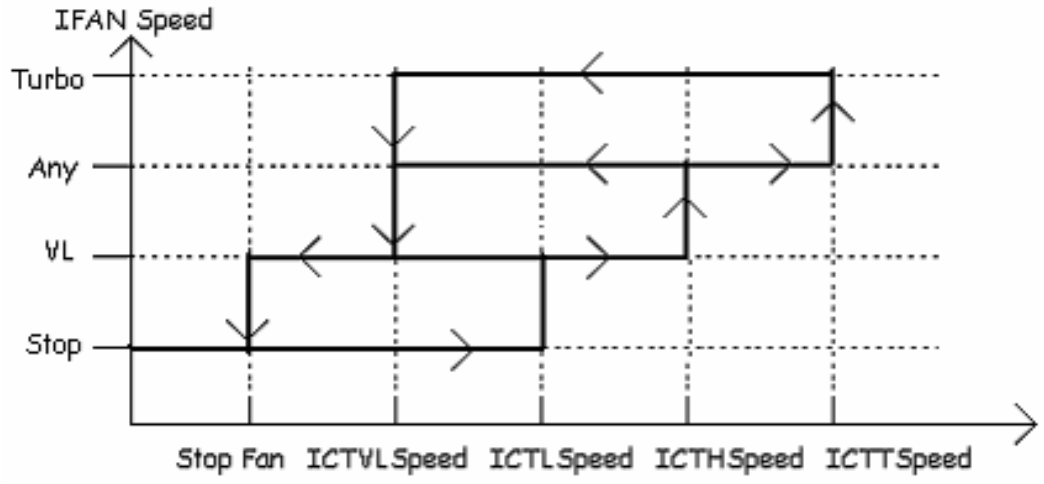
12.4.1 Temperature Compensation

In wall mounted, ducted, and cassette models, 3 degrees are reduced from room temperature reading (except when in I-Feel mode), to compensate for temperature difference between high and low areas in the heated room, and for coil heat radiation on room thermistor.
The temperature compensation can be enabled/disabled by shortening of J2 on the indoor unit Controller

Model	J2 Shorted	J2 Opened
Wall mounted	Compensation Disabled	Compensation Enabled
Cassette	Compensation Enabled	Compensation Disabled
Ducted	Compensation Enabled	Compensation Disabled
Floor/Ceiling	Compensation Disabled	Compensation Enabled

12.4.2 Indoor Fan Control in Heating Mode

Indoor fan speed depends on the indoor coil temperature:



12.5 Auto Cool/Heat Mode

When in auto cool heat mode unit will automatically select between cool and heat mode according to the difference between actual room temperature and user set point temperature (.T). Unit will switch from cool to heat when compressor is off for 3 minutes, and .T < -3.
Unit will switch from heat to cool when compressor is off for 5 minutes, and .T < -3.

12.6 Dry Mode

As long as room temperature is higher then the set point, indoor fan will work in low speed and compressor will work between 0 and *MaxNLOADIF1C* Hz.
When the room temperature is lower than the set point, compressor will be switched OFF and indoor fan will cycle 3 minutes OFF, 1 minute ON.

12.7 Protections

There are 5 protection codes.
Normal (Norm) – unit operate normally.
Stop Rise (SR) – compressor frequency can not be raised but does not have to be decreased.
HzDown1 (D1) – Compressor frequency is reduced by 2 to 5 Hz per minute.
HzDown2 (D2) – Compressor frequency is reduced by 5 to 10 Hz per minute.
Stop Compressor (SC) – Compressor is stopped.

12.7.1 Indoor Coil Defrost Protection

ICT	ICT Trend				
	Fast Increasing	Increasing	No Change	Decreasing	Fast
ICT< *-2*	SC	SC	SC	SC	SC
-2 ≤ ICT<*0*	D1	D1	D2	D2	D2
0 ≤ ICT < *2*	SR	SR	D1	D2	D2
2 ≤ ICT< *4*	SR	SR	SR	D1	D2
4 ≤ ICT < *6*	Norm	Norm	SR	SR	D1
6 ≤ ICT ≤ *8*	Norm	Norm	Norm	SR	SR
ICT> *8*			Norm		

12.7.2 Indoor Coil Overheating Protection

12.7.2.1 Indoor Coil Overheating Protection For DCI 50 / 60 / 72 Z

ICT	ICT Trend				
	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
ICT >*62*	SC	SC	SC	SC	SC
60 ≤ ICT < *62*	D1	D1	D2	D2	D2
55≤ ICT <*60*	SR	SR	D1	D2	D2
52≤ ICT < *55*	SR	SR	SR	D1	D2
48≤ ICT < *52*	Norm	Norm	SR	SR	D1
45≤ ICT ≤ *48*	Norm	Norm	Norm	SR	SR
ICT <*45*			Norm		

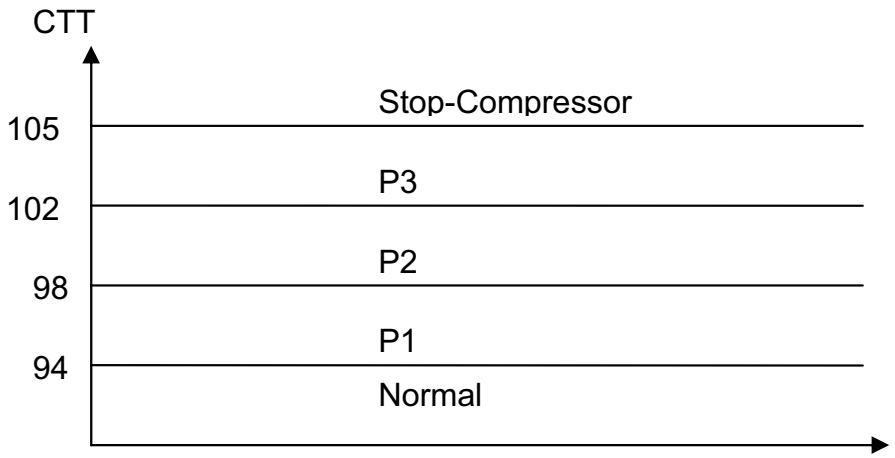
12.7.2.2 Indoor Coil Overheating Protection For GC 24 / 30

ICT	ICT Trend				
	<-2	**-2**	**-1,0,1**	**2**	**>2**
ICT >*62*	SC	SC	SC	SC	SC
60 ≤ ICT < *62*	D1	D1	D2	D2	D2
58≤ ICT <*60*	SR	SR	D1	D2	D2
56≤ ICT < *58*	SR	SR	SR	D1	D2
54≤ ICT < *56*	Norm	Norm	SR	SR	D1
52≤ ICT ≤ *54*	Norm	Norm	Norm	SR	SR
ICT <*52*	Norm				

12.7.3 Compressor Overheating Protection

12.7.3.1 Compressor Overheating Protection for GC 18 / 21 / 24 Z

Compressor temperature can be in one of 5 control zones (4 in protection, and 1 normal),according to the following chart.

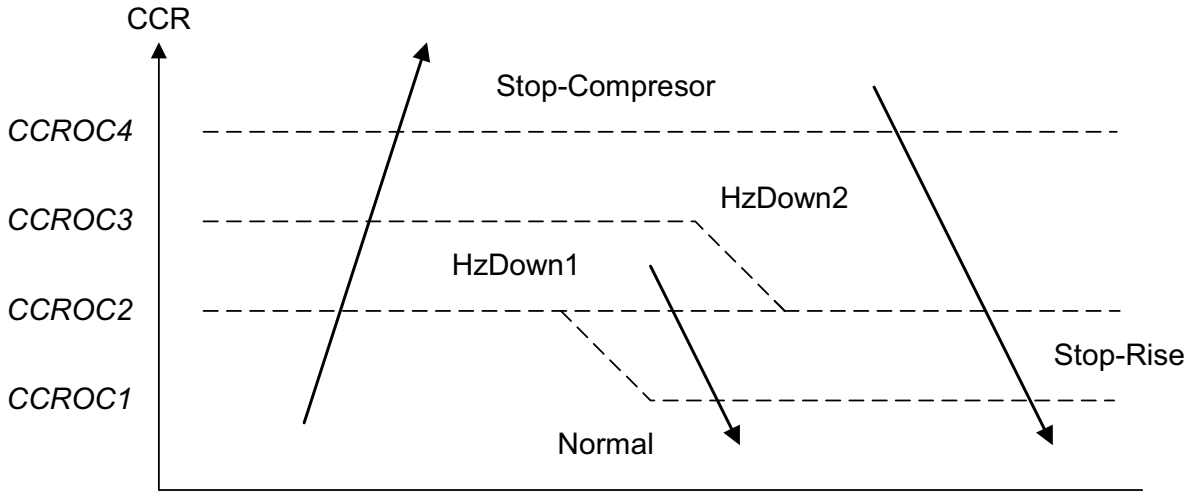


Control Status	Compressor Temperature Increases	Else
P1	Normal	Stop Rise
P2	HzDown 1	Stop Rise
P3	HzDown 2	HzDown 1
Stop Compressor	Stop Compressor	

12.7.3.2 Compressor Overheating Protection for GC 24 / 30

CTT		CTT Trend				
Cool	Heat	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
CTT >*105*	CTT >*105*	SC	SC	SC	SC	SC
100≤ CTT < *105*	*100*≤ CTT < *105*	D1	D1	D2	D2	D2
98≤CTT <*100*	*95*≤CTT <*100*	SR	SR	D1	D2	D2
93≤CTT < *100*	*85*≤CTT < *95*	SR	SR	SR	D1	D1
90≤CTT ≤ *93*	*80*≤CTT ≤ *85*	Norm	Norm	Norm	SR	SR
CTT <*90*	CTT <*80*	Norm				

12.7.4 Compressor Over Current Protection Only For *GC 18 / 21 / 24 Z*



12.7.5 Heat Sink Overheating Protection

12.7.5.1 Heat Sink Overheating Protection For DCI 50 / 60 / 72 Z

HST	HST Trend				
	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
HST ≥ *90*	SC	SC	SC	SC	SC
85 ≤ HST < *90*	D1	D1	D2	D2	D2
82 ≤ HST < *85*	SR	SR	D1	D2	D2
80≤ HST< *82*	SR	SR	SR	D1	D1
78 ≤ HST ≤ *80*	Norm	Norm	Norm	SR	SR
HST < *78*	Norm				

12.7.5.2 Heat Sink Overheating Protection For GC 24 / 30

HST	Delta HST				
	<-2	**-2**	**-1,0,1**	**2**	**>2**
HST≥ *81*	SC	SC	SC	SC	SC
79 ≤ HST < *81*	D1	D1	D2	D2	D2
75 ≤ HST < *79*	SR	SR	D1	D2	D2
73≤ HST< *75*	SR	SR	SR	D1	D1
71 ≤ HST ≤ *73*	Norm	Norm	Norm	SR	SR
HST < *71*	Norm				

12.7.6 System Over Power Protection Only For *GC 24 / 30*

Power		Delta PWR				
		< -2000	***[-2000,0)***	***0***	***(0,2000]***	***> 2000***
PWR1	PWR2					
PWR ≥ *3500*	PWR ≥ *2900*	SC	SC	SC	SC	SC
3300≤PWR < *3500*	*2750*≤PWR < *2900*	D1	D1	D2	D2	D2
3100 ≤PWR < *3300*	*2600*≤PWR < *2750*	SR	SR	D1	D2	D2
3000≤PWR < *3100*	*2450*≤PWR < *2600*	SR	SR	SR	D1	D1
2950 ≤PWR ≤ *3000*	*2300* ≤PWR ≤ *2450*	Norm	Norm	Norm	SR	SR
PWR < *2950*	PWR < *2300*	Norm				

There are two sets of OVRPWR values, the selection of the values are set according to the state of the Power-Shed input.
Power-Shed input open Set values 1
Power-Shed input sort Set values 2

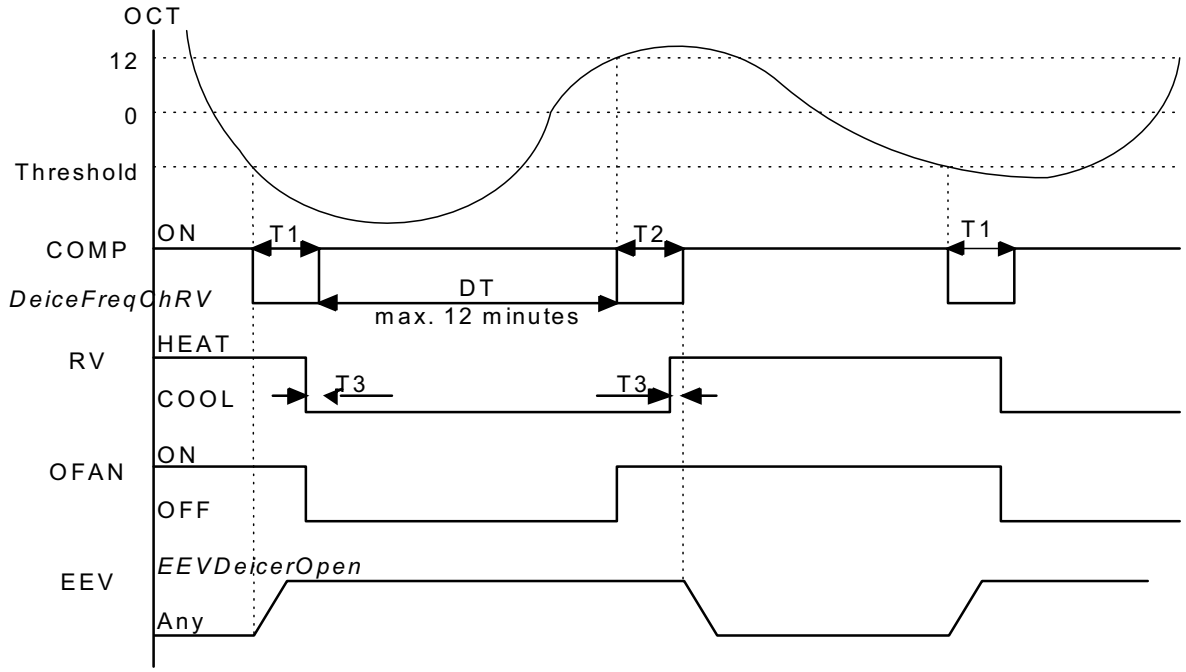
12.7.7 Outdoor Coil Deicing Protection

12.7.7.1 Outdoor coil Deicing Protection For GC 18 / 21 / 24 Z

► **Entering Deicing Conditions**

Deicing operation will start when either one of the following conditions exist:
Case 1: OCT < OAT – 8 AND TLD > DI
Case 2: OCT < OAT – 12 AND TLD > 30 minutes.
Case 3: OCT is Invalid AND TLD > DI
Case 4: Unit is just switched to STBY AND OCT < OAT – 8
Case 5: NLOAD = 0 AND OCT < OAT -8
Case 6: OCT<-*19* AND TLD>*60* minutes
All this condition will exist during 10 seconds
OCT – Outdoor Coil Temperature
OAT – Outdoor Air Temperature
TLD – Time from Last Deicing
DI – Deicing Interval (Time Interval Between Two Deicing)
Deicing interval time when compressor is first started in heat mode, is 10 minutes if OCT < -2, and is 40 minutes in other cases.
Deicing interval time is changed (increased/ decreased in 10 minutes steps) as a function of deicing time. If deicing time is shorter then former deicing time, the deicing interval time will be increased. If deicing time is longer then former deicing time, the deicing interval time will be decreased.

► Deicing Operation Procedure



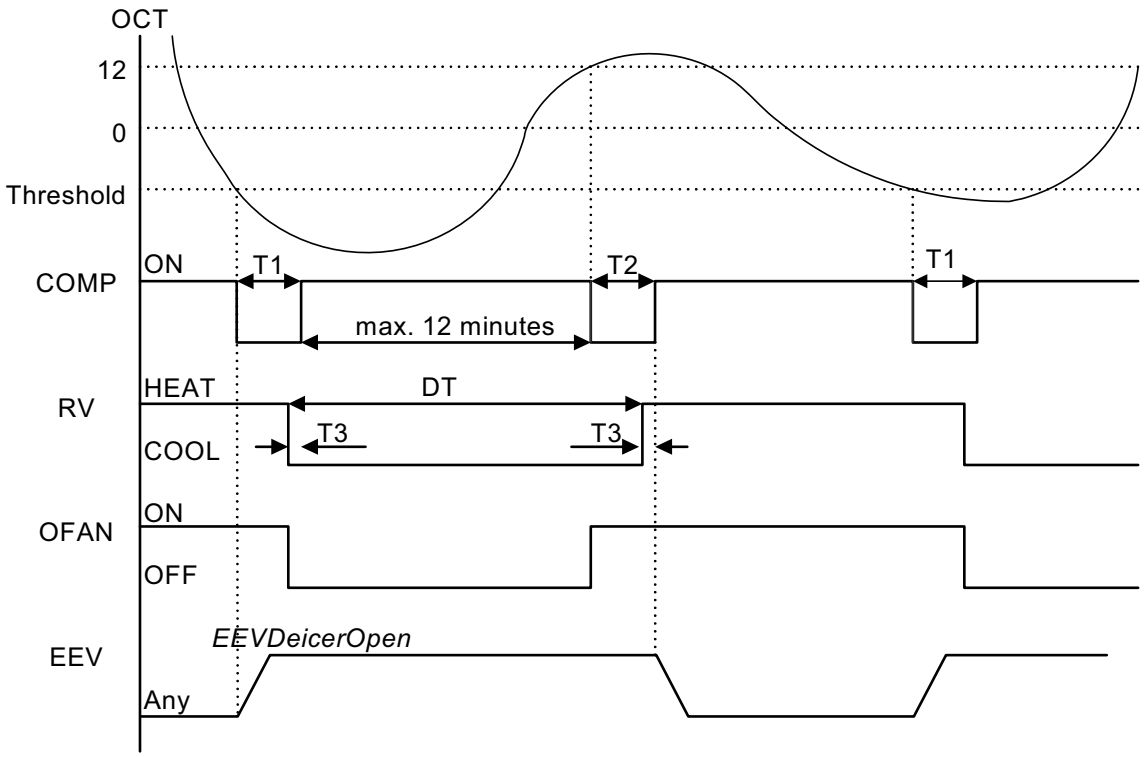
T1=60 secondes;T2=36 secondes;T3=6 secondes

12.7.7.2 Outdoor coil Deicing Protection For GC 24 / 30

► **Entering Deicing Conditions**

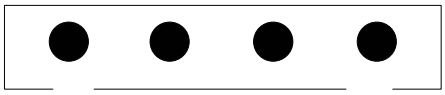
Deicing operation will start when either one of the following conditions exist:
Case 1: OCT < OAT – *8* AND TLD > *DI*
Case 2: OCT < OAT – 12 AND TLD > 30 minutes.
Case 3: OCT is Invalid AND TLD > *DI*
Case 4: Unit is just switched to STBY AND OCT < OAT – *8*
Case 5: NLOAD = 0 AND OCT < OAT - *8*
Case 6: OAT is invalid AND OCT< *8* AND TLD > *DI* AND Compressor ON Time > *15* minutes
All this condition will exist during 400 seconds
OCT – Outdoor Coil Temperature
OAT – Outdoor Air Temperature
TLD – Time from Last Deicing
DI – Deicing Interval (Time Interval between Two Deicing)
Deicing interval time when compressor is first started in heat mode, is 10 minutes if OCT < -2, and is 40 minutes in other cases.
Deicing interval time is changed (increased/ decreased in 10 minutes steps) as a function of deicing time. If deicing time is shorter then former deicing time, the deicing interval time will be increased. If deicing time is longer then former deicing time, the deicing interval time will be decreased.

► **Deicing Operation Procedure**



T1=50 secondes;T2=36 secondes;T3=6 secondes

12.7.8 Condensate Water Over Flow Protection



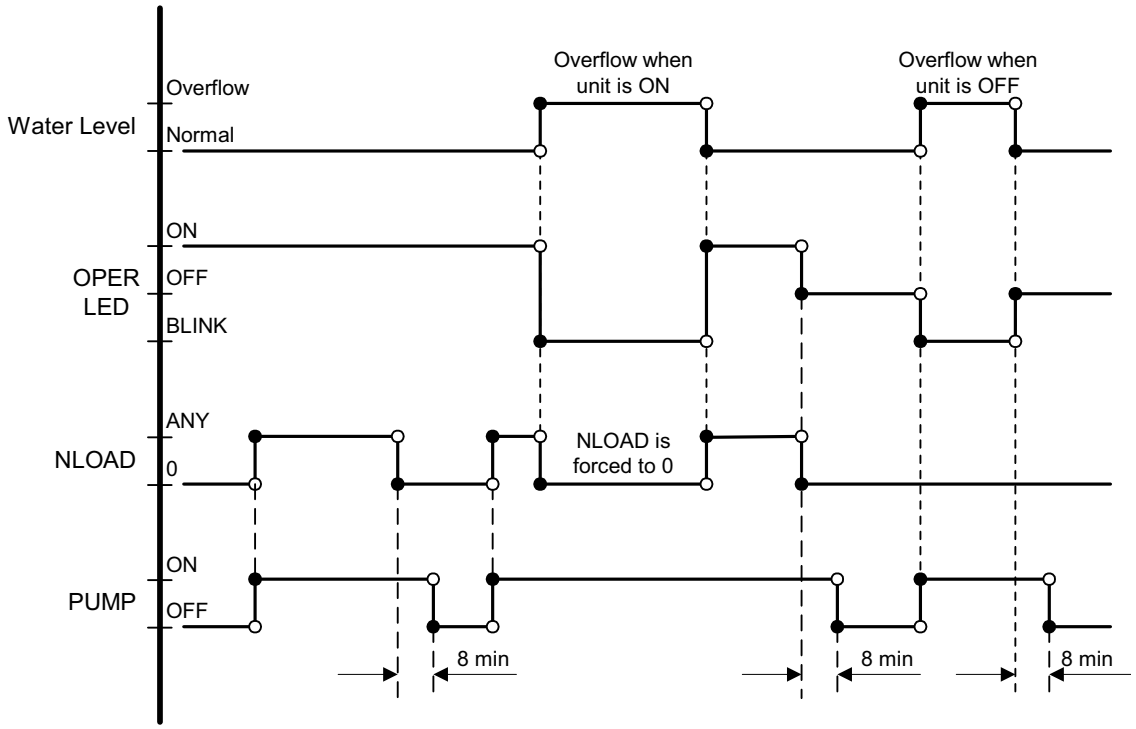
Each of the pins P1, P2, P3 can have two options:
1 – When it is shorted with P4
0 – When it is not shorted to P4

► **Water Level Protection-1 level**

P1	P2	P3	Level
Don't care	Don't care	1	Normal
Don't care	Don't care	0	Overflow

(*) 1- Pin P1, P2, or P3 is connected to P4.

0- Pin P1, P2 or P3 is not connected to P4.



12.8 Indoor Unit Dry Contact

Indoor unit Dry contact has two alternative functions that are selected by J9.

	Function	Contact=open	Contact=short
J9=open	Presence Detector Connection	No limit	Force to STBY
J9=short	Power Shedding Function	No limit	Limit NLOAD

12.9 Operating the Unit from Mode Button

Forced operation allows to start, stop and operate in Cooling or Heating, in pre-set temperature according to the following table:

Forced operation Mode	**Pre-set Temperature**
Cooling	20°C
Heating	28°C

12.10 On Unit Controls and Indicators

12.10.1 Indoor Unit controller Controls and Indicatiors for All Models Except for Floor/Ceiling model

During OFF, Fan, Cool, Heat, Dry, and Auto modes (for operation in other modes, see at the relevant spec paragraph):

STAND BY INDICATOR	1. Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands
OPERATION INDICATOR	1. Lights up during operation. 2. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. 3. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	Lights up when Air Filter needs to be cleaned.
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch on the unit.
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch on the unit.
Mode SWITCH (COOL/HEAT/OFF)	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → … In long pressing system enters diagnostic mode.
RESET / FILTER SWITCH	For short pressing: When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled. When Filter LED is off – enable/disable the buzzer announcer, if selected. In long pressing system enters set up mode (if in SB).

12.10.2 Outdoor Unit controller Indicatiors

Unit has three LED's.
SB LED is ON when power is ON (230 VAC, even when no communication).
STATUS LED is ON when COMP is ON, and Blinks according to diagnostics mode definitions when either fault or protection occurs.
FAULT LED Blinks according to diagnostics mode definitions when either fault or protection occurs.

12.11 Test Mode

12.11.1 Entering Test Mode

System can enter Test mode in two ways:
Automatically when the following conditions exists for 30 minutes continuously:
Mode = Cool, Set point = 16, Room temperature = 27(+1/–2), Outdoor temperature = 35(+2/-1)
Or
Mode = Heat, Set point = 30, Room temperature = 20±1, Outdoor temperature = 7±(+1/-2)
Manually when entering diagnostics with the following settings:
Mode = Cool, Set point = 16
Mode = Heat, Set point = 30

12.11.2 Unit Operation in Test Mode

In test mode, the unit will operate in fixed settings according to the indoor fan speed setting:

Indoor FAN Speed Setting	Unit Setting
Low	Minimum Capacity Setting
Turbo	Nominal Capacity Setting
Auto	Maximum Capacity Setting

During test mode, protections are disabled, except for stop compressor status.

12.12 SW Parameters

12.12.1 Indoor Units SW Parameters

Model dependent parametes - KN

	A (KN-60)	B (KN-72)	C (KN-80)
Cap .Group	3	4	4
NomLoadC	81	61	67
NomLoadH	77	59	67
MaxNLOADIF1C	55	44	85
MaxNLOADIF2C	70	50	102
MaxNLOADIF3C	127	120	120
MaxNLOADIF4C	127	127	127
MaxNLOADIF5C	127	127	127
MinRTC	20	20	20
MaxNLOADRTC	127	127	127
MaxNLOADIF1H	127	127	127
MaxNLOADIF2H	127	127	127
MaxNLOADIF3H	127	127	127
MaxNLOADIF4H	127	127	127
MaxNLOADIF5H	127	127	127
MaxNLOADRTH	127	127	127
MaxRTH	27	27	27
MaxNLOADPSC	81	61	67
MaxNLOADPSH	77	59	67

Model dependent parameters - DNG

Unit	A (DNG50)	B (DNG60)	C (DNG72)	D (DNG80)
Cap .Group	3	3	4	4
NomLoadC	62	77	57	60
NomLoadH	74	80	55	63
ICTSTSpeed	22	22	22	22
ICTVLSpeed	28	28	28	28
ICTLSpeed	30	30	30	30
ICTHSpeed	32	32	32	32
ICTTSpeed	40	40	40	40
MaxNLOADIF1C	50	50	63	78
MaxNLOADIF2C	63	63	85	100
MaxNLOADIF3C	120	120	115	127
MaxNLOADIF4C	127	127	127	127
MaxNLOADIF5C	127	127	127	127
MinRTC	20	20	20	20
MaxNLOADRTC	127	127	127	127
MaxNLOADIF1H	127	127	127	127
MaxNLOADIF2H	127	127	127	127
MaxNLOADIF3H	127	127	127	127
MaxNLOADIF4H	127	127	127	127
MaxNLOADIF5H	127	127	127	127
MaxNLOADRTH	127	127	127	127
MaxRTH	27	27	27	27
MaxNLOADPSC	62	77	57	60
MaxNLOADPSH	74	80	55	63

Model dependent parameters - WNG

Parameter name	(FLO) Wall Mounted Models					
	25	35	50	60	72	80
NLOAD limits as a function of selected indoor fan speed						
MaxNLOADIF1C	40	40	45	50	53	68
MaxNLOADIF2C	53	53	62	85	75	90
MaxNLOADIF3C	120	120	120	120	105	120
MaxNLOADIF4C	127	127	127	127	127	127
MaxNLOADIF5C	127	127	127	127	127	127
Indoor Fan speeds						
IFVLOWC	700	700	700	800	850	850
IFLOWC	800	800	900	1000	1000	1000
IFMEDC	900	950	1050	1100	1150	1150
IFHIGHC	1050	1100	1200	1250	1350	1300
IFTURBOC	1150	1200	1250	1300	1400	1350
IFVLOWH	700	700	700	800	900	900
IFLOWH	800	850	900	950	1050	1050
IFMEDH	950	1000	1100	1150	1200	1200
IFHIGHH	1100	1150	1250	1250	1350	1300
IFTURBOH	1200	1250	1300	1300	1400	1350

Model dependent parameters - PXD

Unit	A (PXD50)	B (PXD60)	C (PXD72)	D (PXD80)
Cap .Group	3	3	4	4
NomLoadC	68	80	60	63
NomLoadH	77	82	60	67
MaxNLOADIF1C	40	50	127	127
MaxNLOADIF2C	60	85	127	127
MaxNLOADIF3C	90	127	127	127
MaxNLOADIF4C	90	127	127	127
MaxNLOADIF5C	90	127	127	127
MinRTC	20	20	20	20
MaxNLOADRTC	127	127	127	127
MaxNLOADIF1H	127	127	127	127
MaxNLOADIF2H	127	127	127	127
MaxNLOADIF3H	127	127	127	127
MaxNLOADIF4H	127	127	127	127
MaxNLOADIF5H	127	127	127	127
MaxNLOADRTH	127	127	127	127
MaxRTH	27	27	27	27
MaxNLOADPSC	68	80	60	63
MaxNLOADPSH	77	82	60	67

12.12.2 Outdoor Units SW Parameters:

Model dependent parameters for GC 18 / 21

#	Name	Single GC 18	Single GC 21
1	MinFreqC	20	20
2	MaxFreqC	85	95
3	MinFreqH	20	26
4	MaxFreqH	95	94
5	NormAccel	1	1
6	NormDecel	1	1
7	Step1Freq	60	60
8	Step2Freq	70	70
9	Step3Freq	90	90
10	OFVL	20	20
11	OFLOWC	60	55
12	OFMEDC	76	70
13	OFMAXC	92	79
14	OFLOWH	60	55
15	OFMEDH	83	70
16	OFMAXH	100	79
17	OFANTESTMODEC	92	83
18	OFANTESTMODEH	100	83
19	OFDelTestMode	28	28
20	CTTOH1	94	94
21	CTTOH2	98	98
22	CTTOH3	102	102
23	CTTOH4	105	105
24	CCROC1	10	11.4
25	CCROC2	10.5	11.8
26	CCROC3	10.8	12.2
27	CCROC4	11.2	12.6
28	DEICT1	60	60
29	DEICT2	36	36
30	DEICT3	6	6
31	ProtFreqLimit	60	60
32	EEVDecierOpen	100	180
33	OptimDeicFreq	90	90
34	EEVMinOperOpenC	50	80
35	EEVMaxOperOpenC	380	380
36	EEVMinOperOpenH	50	60
37	EEVMaxOperOpenH	380	300
38	EEVNormRate	33	33
39	EEVHighRate	12	12
40	EEVMaxOpen	500	500
41	OFLowFreqC	40	35
42	OFMedFreqC	70	55
43	OFLowFreqH	40	40
44	OFMedFreqH	86	60
45	HeaterDisableFlag	0	0
46	DeiceFreqChRV	0	0
47	OATRefC	35	35
48	SUCT Enable	0	0
49	HST Enable	1	1
50	OAT Enable	1	1
51	OATRefH	7	7
52	MinTargCTTC	30	30
53	MaxTargCTTC	95	90
54	MinTargCTTH	40	45
55	MaxTargCTTH	95	90
56	DST	8	8
57	DSTF	12	12
58	OATLimitC	28	28
59	OATLimit1H	6	6
60	OATLimit2H	15	15
61	MaxFreqAsOATC	64	85
62	MaxFreqAsOAT1H	85	80
63	MaxFreqAsOAT2H	60	60

Model dependent parameters for *GC 24 / 30*

Compressor Parameters	Value
MinOFFTime	3
MinOnTime	3
MaxCTT1	90
MaxCTT2	90
MinSpeedAsCTT1	26
MinSpeedAsCTT2	26
MaxSpeedC	75
MaxSpeedH	95
Step1RPS	40
Step2RPS	60
Step3RPS	75
NormAcc (sec/RPS)	1
NormDec (sec/RPS)	1
Down1(Sec/RPS)	12
Down2 (Sec/RPS)	7
DeiceAcc (Sec/RPS)	0.2
DeiceDec (Sec/RPS)	0.5

EEV Parameters	Value
NormEEVRate	30
EEVCompOFFOpen	200
EEVCompOFFTime	60
EEVMaxOpen	500
EEVMinOperOpenC	60
EEVMaxOperOpenC	500
EEVMinOperOpenH	70
EEVMaxOperOpenH	500
EEVMinOperOpenHInIDU	60
EEVMaxOperOpenHInIDU	140
EEVIDUOFFOpen	130
EEVMoveSteps	20
EEVTConstC	30
EEVTConstH	30
BlncTimTrnsStC	1
BlncTimStdyStC	1
BlncTimTrnsStH	1
BlncTimStdyStH	1
CompOffTimToTrnsSt	20

Model dependent parameters for GC 24 Z

No.	Name	SingleDCI-72 Z
1	MinFreqC	15
2	MaxFreqC	70
3	MinFreqH	15
4	MaxFreqH	90
7	Step1Freq	35
8	Step2Freq	55
9	Step3Freq	90
10	OFMinRPM	**8**
11	OFMaxRPM	90
12	NightRPM	65
13	OFNNoiseMaxRPM	78
14	CTTOH1	90
15	CTTOH2	95
16	CTTOH3	100
17	CTTOH4	105
18	CCROC1	12.5
19	CCROC2	13.3
20	CCROC3	14.1
21	CCROC4	14.9
22	ProtFreqLimit	60
23	EEVMinOperOpenC	50
24	EEVMaxOperOpenC	480
25	EEVMinOperOpenH	50
26	EEVMaxOperOpenH	480
27	HeaterDisableFlag	0
28	HST Enable	1
29	OATLimitC	24
30	OATLimit1H	6
31	OATLimit2H	15
32	MaxFreqAsOATC	60
33	MaxFreqAsOAT1H	85
34	MaxFreqAsOAT2H	75
35	NormAccel	1
36	NormDecel	1

13. TROUBLESHOOTING

13.1 Troubleshooting for GC 9 / 12 / 18 / 21 / 24 Z DCI

WARNING!!!

When Power Up – the whole outdoor unit controller, including the wiring, is under HIGH VOLTAGE!!!
Never open the Outdoor unit before turning off the Power!!!
When turned off, the system is still charged (400V)!!!
It takes about 3 Min. to discharge the system.
Touching the controller before discharging may cause an electrical shock!!!

13.1.1 Single Split System failures and Corrective Actions

No	Symptom	Probable Cause	Corrective Action
1	Power supply indicator (Red LED) does not light up.	No power supply	Check power supply. If power supply is OK, check display and display wiring. if OK, replace controller.
2	Unit does not respond to remote control message	Remote control message not reached the indoor unit	Check remote control batteries, if batteries are OK, check display and display wiring, if OK, replace display PCB. If still not OK replace controller.
3	Unit responds to remote control message but Operate indicator (Green LED) does not light up	Problem with display PCB	Replace display PCB. If still not OK replace controller.
4	Indoor fan does not start (louvers are opened and Green LED does light up)	Unit in heat mode and coil is still not warm.	Change to cool mode and check.
		Problem with PCB or capacitor	Change to high speed and Check power supply to motor is higher than 130VAC (for triack controlled motor) or higher than 220VAC for fixed speed motors, if OK replace capacitor, if not OK replace controller.
5	Indoor fan works when unit is OFF, and indoor fan speed is not changed by remote control command.	PCB problem	Replace controller
6	Compressor does not start	Electronics control problem or protection	Perform diagnostics and follow the actions described.
7	Compressor stops during operation and Green LED remains on	Electronic control or power supply problem	Perform diagnostics and follow the actions described.
8	Compressor is on but outdoor fan does not work	Problem with outdoor electronics or outdoor fan	Check outdoor fan motor according to the procedure below, if not OK replace controller.

No	Symptom	Probable Cause	Corrective Action
9	Unit works in wrong mode (cool instead of heat or heat instead of cool)	Electronics or power connection to RV	Check RV power connections, if OK, check RV operation with direct 230VAC power supply, if OK, replace outdoor controller.
10	All components are operating properly but no cooling or no heating	Refrigerant leak	Check refrigeration system.
11	Compressor is over heated and unit does not generate capacity	EEV problem	Check EEV.
12	Units goes into protections and compressor is stopped with no clear reason	Control problem or refrigeration system problem	Perform diagnostics , and follow the actions described.
13	Compressor motor is generating noise and no suction occurs	Phase order to compressor is wrong	Check compressor phase order.
14	Water leakage from indoor unit	Indoor unit drainage tube is blocked	Check and open drainage tube.
15	Freezing of outdoor unit in heat mode and outdoor unit base is blocked with ice		Connect base heater.
16	Unit operates with wrong fan speeds or wrong frequency	Wrong jumper settings	Perform diagnostics, and check if units is operating by EEPROM parameters.

13.1.2 Checking the refrigeration system

Checking system pressures and other thermodynamic measures should be done when system is in Test Mode (in Test mode, system operates in fixed settings). The performance curves given in this manual are given for unit performance in test mode when high indoor fan speed is selected.
Entering test mode:
Set unit to Cool/16 degrees/High indoor fan speed, or Heat/30 degrees/High indoor fan speed, and enter diagnostics.

13.1.3 Judgment by Indoor/Outdoor Unit Diagnostics

Enter diagnostics mode - press for five seconds Mode button in any operation mode. Acknowledgment is by 3 short beeps and lights of COOL and HEAT LED's. Then, every short pressing of Mode button will scroll between Indoor and Outdoor unit diagnostic modes by the acknowledgment of 3 short beeps and lighting of COOL and HEAT LED's.
During the Outdoor unit diagnostics all four Indoor LED's (STBY, Operate, Filter and Timer) are blinking. When Indoor diagnostics is displayed, all four LED's (STBY, Operate, Filter and Timer) are ON.

When system enters diagnostics mode, only one fault code is shown. Order of priority is from the lower to the higher number. Diagnostics is continuously ON as long as power is ON. The current system operation mode will not be changed.
If no fault occurred in the system, no fault code will be displayed during normal operation mode. The last fault code will be displayed even if the system has recovered from that fault. The last fault will be deleted from the EEPROM after the system has exit diagnostics mode.

In diagnostics mode, system fault / status will be indicated by blinking of Heat & Cool LEDs.
The coding method will be as follows:
Heat LED will blink 5 times in 5 seconds, and then will be shut off for the next 5 seconds. Cool LED will blink during the same 5 seconds according to the following Indoor / Outdoor unit tables:
Note: 0 – OFF, 1-ON

13.1.4 Indoor Unit Diagnostics

No	Problem	5	4	3	2	1
1	RT-1 is disconnected	0	0	0	0	1
2	RT-1 is shorted	0	0	0	1	0
3	RT-2 is disconnected	0	0	0	1	1
4	RT-2 is shorted	0	0	1	0	0
5	Reserved	0	0	1	0	1
7	Communication mismatch	0	0	1	1	1
8	No Communication	0	1	0	0	0
9	No Encoder	0	1	0	0	1
10	Reserved	0	1	0	1	0
11	Outdoor Unit Fault	0	1	0	1	1
…	Reserved					
17	Defrost protection	1	0	0	0	1
18	Deicing Protection	1	0	0	1	0
19	Outdoor Unit Protection	1	0	0	1	1
20	Indoor Coil HP Protection	1	0	1	0	0
21	Overflow Protection	1	0	1	0	1
22	Reserved					
24	EEPROM Not Updated	1	1	0	0	0
25	Bad EEPROM	1	1	0	0	1
26	Bad Communication	1	1	0	1	0
27	Using EEPROM data	1	1	0	1	1
28	Model A	1	1	1	0	0
29	Model B	1	1	1	0	1
30	Model C	1	1	1	1	0
31	Model D	1	1	1	1	1

13.1.4.1 Indoor Unit Diagnostics and Corrective Actions

No.	Fault	Probable Cause	Corrective Action
1	Sensor failures of all types		Check sensor connections or replace sensor
2	Communication mismatch	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
3	No Communication	Communication or grounding wiring is not good.	Check Indoor to Outdoor wiring and grounding
4	No Encoder	Indoor electronics or motor	Check motor wiring, if ok, replace motor, if still not ok, replace Indoor controller.
5	Outdoor Unit Fault	Outdoor controller problem	Switch to Outdoor diagnostics.
6	EEPROM Not Updated	System is using ROM parameters and not EEPROM parameters	No action, unless special parameters are required for unit operation.
7	Bad EEPROM		No action, unless special parameters are required for unit operation.
8	Bad Communication	Communication quality is low reliability	Check Indoor to Outdoor wiring and grounding
9	Using EEPROM data	No problem. System is using EEPRRRROM parameters	
10	The power supply indicator (red led) doesn't light up.	There is no correct voltage between the line and neutral terminals on main P.C.B.	-If the voltage is low repair power supply. -If there is no voltage repair general wiring. -If there is correct voltage replace main or display P.C.B'S
11	TThe operating indicator (green led) does not light up	The remote control batteries are discharged	-Replace batteries of the remote control
12	The operating indicator (green led) does not light up when starting from unit..	Check main P.C.B and display P.C.B.	-Replace P.C.B if necessary.
13	The indoor fan does not function correctly.	Check the voltage between indoor fan terminals on the main P.C.B	- If there is voltage replace capacitor or motor.

No.	Fault	Probable Cause	Corrective Action
14	The outdoor fan does not function correctly.	Check the voltage between indoor fan terminals on the main P.C.B. There is voltage between outdoor fan terminals on the outdoor unit. There is no voltage between outdoor fan terminals on the outdoor unit.	- If there is no voltage replace main P.C.B - Replace capacitor or motor. - Check and repair electrical wiring between indoor and outdoor units.
15	The compressor does not start up.	Check voltage on compressor terminals on the outdoor unit. (with ampmeter) Check if there is correct voltage between compressor terminals on the outdoor unit.	-If no voltage replace main P.C.B. - If low voltage repair power supply. -If the voltage corrrect replace capacitor or compressor. -If there is no voltage repair electrical wiring between indoor and outdoor units.
16	The refrigeration system does not function correctly.	Check for leaks or restrictions, with ampmeter, pressure guage or surface thermometer.	- Repair refrigeration system and charge refrigerant if necessary.
17	No cooling or heating only indoor fan works.	Outdoor fan motor faulty or other fault caused, compresssor overload protection cut out.	-Replace P.C.B. - Outdoor fan blocked remove obstructions.
18	Only indoor fan and compressor working.	Outdoor fan blocked.	- Remove obstructions.
19	Only indoor fan working.	-Run capacitor of outdoor fan motor faulty. -Windings of outdoor fan are shorted.	- Replace capacitor. -Replace motor.

No.	Fault	Probable Cause	Corrective Action
20	No cooling or heating takes place, indoor and outdoor fans working.	- Overload safety device on compressor is cut out (low voltage or high temperature) - Compressor run capacitor faulty. - Compressor windings are shorted.	- Check for proper voltage, switch off power and try again after one hour. - Replace compressor capacitor. - Replace compressor.
21	No air supply at indoor unit, compressor operates.	-Indoor fan motor is blocked or turns slowly. -indoor fan run capacitor faulty. - motor windings are shorted.	- Check voltage,repair wiring if necessary. -Check fan wheel if it is tight enough on motor shaft,tighten if necessary. -Replace indoor fan motor.
22	Partial, limited air supply at indoor indoor unit.	Lack of refrigerant (will accompanied by whisteling noise) cause ice formation on indoor unit coil in cooling mode.	-Charge the unit after localizing leak.
23	Water accumulates and overflow from indoor unit section.	Drain tube or spout of drain pan clogged.	-Disasemble plastic drain tube from spout of indoor unit drain pan.
24	Water dripping from outdoor unit base. (in heating mode)	Water drain outlet is clogged.	-Open outdoor unit cover clean out water outlet ,clean the base inside througly.
25	Freeze-up of outdoor coil in heating mode, poor heating effect in room, indoor fan operates.	-Faulty outdoor thermistor. -Faulty control cable. - Outdoor temperature is too low (below -2°C) -Outdoor unit air outlet is blocked.	-Replace thermistor. - Repair control cable. - Shut unit off, outdoor temp. is below design conditions and cannot function properly. -Remove obstructions.

13.1.5 Outdoor Unit Diagnosits

No	Problem	5	4	3	2	1
1	OCT is disconnected	0	0	0	0	1
2	OCT is shorted	0	0	0	1	0
3	CTT is disconnected	0	0	0	1	1
4	CTT is shorted	0	0	1	0	0
5	HST is disconnected (when enabled)	0	0	1	0	1
6	HST is shorted (when enabled)	0	0	1	1	0
7	OAT is disconnected (when enabled)	0	0	1	1	1
8	OAT is shorted (when enabled)	0	1	0	0	0
9	TSUC is disconnected (when enabled)	0	1	0	0	1
10	TSUC is shorted (when enabled)	0	1	0	1	0
11	IPM Fault	0	1	0	1	1
12	Bad EEPROM	0	1	1	0	0
13	DC under voltage	0	1	1	0	1
14	DC over voltage	0	1	1	1	0
15	AC under voltage	0	1	1	1	1
16	Indoor / Outdoor unit Communication mismatch	1	0	0	0	0
17	No Communication	1	0	0	0	1
18	Reserved	1	0	0	1	0
20	Heat sink Over Heating	1	0	1	0	0
21	Deicing	1	0	1	0	1
22	Compressor Over Heating	1	0	1	1	0
23	Compressor Over Current	1	0	1	1	1
24	No OFAN Feedback	1	1	0	0	0
25	OFAN locked	1	1	0	0	1
26	Compressor Lock	1	1	0	1	0
27	Bad Communication	1	1	0	1	1

13.1.5.1 Outdoor Unit Diagnostics and Corrective Actions

No	Fault	Probable Cause	Corrective Action
1	Sensors failures of all types		Check sensors connections or replace sensors.
2	IPM Fault	Electronics HW problem	Check all wiring and jumper settings, if OK, replace electronics.
3	Bad EEPROM		No action, unless special parameters are required for unit operation.
4	DC under/over Voltage	Electronics HW problem	Check outdoor unit power supply voltage
5	AC under Voltage		Check outdoor unit power supply voltage
6	Indoor / Outdoor unit Communication mismatch	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
7	No Communication	Communication or grounding wiring is not good.	Check Indoor to Outdoor wiring and grounding
8	Compressor Lock		Switch unit to STBY and restart
9	Bad Communication	Communication quality is low reliability	Check Indoor to Outdoor wiring and grounding

13.1.6 Judgment by MegaTool

MegaTool is a special tool to monitor the system states.
Using MegaTool requires:
A computer with RS232C port.
A connection wire for MegaTool.
A special MegaTool software.
Use MegaTool according to following procedure:
Setup MegaTool software: copy the software to the computer.
Connect RS232C port in computer with MegaTool port in Indoor/Outdoor unit controller by the connection wire.
Run the software and choose the COM port, you can monitor the A/C system state
In monitor tab

13.1.7 Simple procedures for checking the Main Parts

13.1.7.1 Checking Mains Voltage.

Confirm that the Mains voltage is between 198 and 264 VAC. If Mains voltage is out of this range, abnormal operation of the system is expected. If in range check the Power (Circuit) Breaker and look for broken or loosed cable lugs or wiring mistake(s).

13.1.7.2 Checking Power Input.

If Indoor unit power LED is unlighted, power down the system and check the fuse of the Indoor unit. If the fuse is OK replace the Indoor unit controller. If the fuse has blown, replace the fuse and power up again.
Checking Power Input procedure for the Outdoor unit is the same as with the Indoor unit.

13.1.7.3 Checking the Outdoor Fan Motor.

Enter Test Mode (where the OFAN speed is high)
Check the voltage between lead wires according to the normal value as following:
Between red wire and black wire: 310VDC +/- 20V
Between orange wire and black wire: 15VDC +/- 1V
Between yellow wire and black wire: 2-6VDC

13.1.7.4 Checking the Compressor.

The compressor is brushless permanence magnetic DC motor. Three coil resistance is same. Check the resistance between three poles. The normal value should be below 0.5 ohm (TBD).

13.1.7.5 Checking the Reverse Valve (RV).

Running in heating mode, check the voltage between two pins of reverse valve connector, normal voltage is 220VAC.

13.1.7.6 Checking the electrical expansion valve (EEV).

The EEV has two parts, drive part and valve. The drive part is a step motor; it is ringed on the valve. Check the drive voltage (12VDC). When Outdoor unit is power on, EEV shall run and have click and vibration.

13.1.8 Precaution, Advise and Notice Items

13.1.8.1 High voltage in Outdoor unit controller.

Whole controller, including the wires that are connected to the Outdoor unit controller may have the potential hazard voltage when power is on. Touching the Outdoor unit controller may cause an electrical shock.
Advise: Don't touch the naked lead wire and don't insert finger, conductor or anything else into the controller when power is on.

13.1.9 Charged Capacitors

Three large-capacity electrolytic capacitors are used in the Outdoor unit controller. Therefore, charging voltage (380VDC) remains after power down. Discharging takes about four minutes after power is off. Touching the Outdoor unit controller before discharging may cause an electrical shock.

13.1.10 Additional advises

When disassemble the controller or the front panel, turn off the power supply.
When connecting or disconnecting the connectors on the PCB, hold the whole housing, don't pull the wire.
There are sharp fringes and sting on shell. Use gloves when disassemble the A/C units.

13.2 Troubleshooting for *GC 24 / 30 DCI*

WARNING!!!

When Power Up – the whole outdoor unit controller, including the wiring, is under HIGH VOLTAGE!!!

Never open the Outdoor unit before turning off the Power!!!

When turned off, the system is still charged (400V)!!!

It takes about 1 Min. to discharge the system.

Touching the controller before discharging may cause an electrical shock!!!

13.2.1 General System Failures and Corrective Actions

No	Symptom	Probable Cause	Corrective Action
1	Indoor unit power supply indicator (Red LED) does not light up.	No power supply	Check power supply. If OK, check display and display wiring. if OK, replace controller
2	Indoor unit does not respond to remote control message	Remote control message not reached the indoor unit	Check remote control batteries, if OK, check display and display wiring, if OK, replace display PCB. If still not OK replace controller
3	Indoor unit responds to remote control message but Operate indicator (Green LED) does not light up	Problem with display PCB	Replace display PCB. If still not OK replace controller
4	Indoor fan does not start (louvers are opened and Green LED is ON)	Unit in heat mode and coil is still not warm	Change to cool mode
		Outdoor unit is in opposite mode	Change operation mode
		Problem with controller or capacitor	Change to high speed and Check power supply to motor is higher than 130VAC (for triack controlled motor) or higher than 220VAC for fixed speed motors, if OK replace capacitor, if not OK replace controller
5	Indoor fan works when unit is OFF, and indoor fan speed is not changed by remote control command.	Controller problem	Replace controller
6	Water leakage from indoor unit	Indoor unit drainage tube is blocked	Check and open drainage tube

No	Symptom	Probable Cause	Corrective Action
7	Outdoor unit display board and leds are off	No power supply	Check the connections and the wiring on the main terminal - Repair if needed.
		PFC Chock coil	Check the PFC Chock coil
		Burnt fuse	Check 20A fuse on the Filter
8	Compressor operates but no capacity	EEV problem	Check EEV
		Refrigerant leakage	Check refrigeration system
		Indoor coil block	Clean filters and/or remove block
		Outdoor coil block	Remove block and/or avoid air by-pass
9	Compressor is over heated and unit does not generate capacity	EEV problem	Check EEV
		Refrigerant leakage	Check refrigeration system)
		Indoor coil block	Clean filters and/or remove block
		Outdoor coil block	Remove block and/or avoid air by-pass
10	Compressor stops during operation	Electronic control	Check diagnostics
		Refrigerant leakage	Check refrigeration system
11	Unit is not operating	Communication problems	Check diagnostics
12	Compressor does not start	Electronics control problem or protection	
13	Unit works in wrong mode (cool instead of heat or heat instead of cool)	Electronics or RV problem	Check RV
14	All components are operating properly but no cooling or no heating	Refrigerant leak	Check refrigeration system
15	Compressor motor is generating noise and no suction occurs	Phase order to compressor is wrong	Check compressor phase order
16	Freezing of outdoor unit in heat mode and outdoor unit base is blocked with ice		Connect base heater
17	The unit stop suddenly during operation	EMC interference to the A/C unit	Check for EMC problems
18	Indoor unit(s) Indicator(s) leds may flicker		

No	Symptom	Probable Cause	Corrective Action
21	Other home appliances operation is faulty such as noise appears in the television picture, or the picture is distorted or static occurs in the radio sound	EMC interference by the A/C unit	Check for EMC problems
22	All others	Specific problems of indoor or outdoor units	Check diagnostics

13.2.2 Checking the refrigeration system

Checking system pressures and other thermodynamic measures should be done when system is in technician Mode where the system operates as in fixed settings. The performance curves given in this manual are given for unit performance in Technician mode when high indoor fan speed is selected.

13.2.3 Diagnostics

13.2.3.1 Outdoor unit diagnostics

If any fault exists in the system, it will be shown according to tIf no fault exists in the system, no fault code will be displayed during normal operation mode, and the status led will be on while the compressor is enable.he following coding method.
Two LEDs display the system diagnostics on real time as follows:
STATUS LED is blinking 5 times in 5 seconds, and shut off for the next 5 seconds.
FAULT LED will blink during the same 5 seconds according to the following table:

No	Problem	5	4	3	2	1
1	OCT bad	0	0	0	0	1
2	CTT bad	0	0	0	1	0
3	HST bad	0	0	0	1	1
4	OAT bad	0	0	1	0	0
5	OMT bad	0	0	1	0	1
6	RGT bad	0	0	1	1	0
7	OFAN/Compressor Feedback Loss	0	0	1	1	1
8	OFAN- IPM fault	0	1	0	0	0
9	OFAN Lock	0	1	0	0	1
10	OFAN- Vospd exceeded	0	1	0	1	0
11	Compressor- IPM Fault	0	1	0	1	1
12	Compressor Lock	0	1	1	0	0
13	Compressor- Vospd exceeded	0	1	1	0	1
14	Compressor- Foldback	0	1	1	1	0
15	DC under voltage	0	1	1	1	1
16	DC over voltage	1	0	0	0	0
17	AC under voltage	1	0	0	0	1
18	No communication A	1	0	0	1	0
19	reserved	1	0	0	1	1
20	reserved	1	0	1	0	0
21	reserved	1	0	1	0	1
22	Compressor- Ilegal Speed	1	0	1	1	0
23	System Configuration Changed	1	0	1	1	1
24	System Configuration Problem	1	1	0	0	0
25	Heat sink Over Heating Fault/Protection	1	1	0	0	1
26	Deicing Protection	1	1	0	1	0
27	Compressor Over Heating Protection	1	1	0	1	1
28	System over power Protection	1	1	1	0	0
29	Bad EEPROM	1	1	1	0	1
30	Not Configured	1	1	1	1	0
31	Bad Communication	1	1	1	1	1

Notes:
1 - ON,0 - OFF

Whenever this table is updated, the installation test procedure, and the alarm output function should be updated.
Only one code is shown.
Order of priority is 1-32. Diagnostics is continuously ON as long as power is on.
Heat Sink Over Heating Protection, Compressor Over Heating Protection, and System Over Power Protection are declared only whenever in 'Stop-Compressor' status.
All faults, except the thermistor faults, will remain at least 10 seconds. This rule comes to serve the monitoring utilities, in a case the fault is released quickly it will be still shown under the monitoring utilities.
Thermistor faults are reported only when they are enabled.
When the outdoor unit is in fault (not protection), an in-fault signal is sent to the indoor. When all the outdoor unit faults are cleared, 'no-fault' signal is sent to the indoor.

13.2.3.2 Outdoor fault corrective actions

No	Fault Name	Probable Cause	Corrective Action
1	OCT bad	Thermistor not connected or damaged	Check Thermistor
2	CTT bad		
3	HST bad		
4	OAT bad		
5	TSUC bad		
6	RGT bad		
7	OFAN/Compressor Feedback Loss	OFAN halls or wires bad. Compressor wire cable bad or IPM bad or compressor bad	Check OFAN motor and compressor
8	OFAN - IPM fault	Over current / Over temperature of OFAN IPM	Check no obstruction to controller air opening Check OFAN motor Check motor type matches motor jumpers in controller
9	OFAN Lock	Fan does not rotate	Check OFAN motor
10	OFAN- Vospd exceeded	Exceeds speed high limit	Check motor type matches motor jumpers in controller Make necessary arrengments in unit installation location to avoid back wind Avoid EMC problems
11	Compressor- IPM Fault	Over current / Over temperature of compressor IPM	Check no obstruction to controller air opening Check Compressor
12	Compressor Lock	Compressor does not rotate	Check Compressor
13	Compressor- Vospd exceeded	Exceeds speed limit	Try again and replace controller if still have the problem
14	Compressor-Foldback	High pressure / Current reduces compressor speed	Check Compressor
15	DC under voltage	DC voltage is lower than limit	Replace controller
16	DC over voltage	DC voltage exceeds its high limit	Check if input voltage higher than limit (270VAC), if not and the problem presist, replace controller. If voltage is high, shut off the power and recommend the customer to fix the power supply
17	AC under voltage	AC input voltage is lower than limit	Check if input voltage lower than limit (170VAC), if not and the problem presist, replace controller. If voltage is low, recommend the customer to fix the power supply

No	Fault Name	Probable Cause	Corrective Action
18	No communication A	No signals in line A	Check communication
19	Compressor- Ilegal Speed	Exceeds speed low limit	See # 13
20	System Configuration Changed	Communication lines changed from last operation	No problem just an announcement
21	System Configuration Problem	Miss-match between the IDUs connected to port A,B,C or D, or the total capacity code of IDUs is higher than the ODU maximum capacity code	Change configuration if needed.
22	Heat sink Over Heating Fault/ Protection	Compressor stopped due to heatsink protection	Check that the airflow around the ODU is free and the fan is running free. Check fan motor (0)
23	Deicing Protection	During deicing procedure	No action required
24	Compressor Over Heating Protection	Compressor stopped due to over heat protection	Check if gas is missing in the system
25	System over power Protection	Compressor stopped due to over power protection	No action required
26	Bad EEPROM	EEPROM not operating	Power reset. (Replace Controller just in case you need EEPROM).
27	Not Configured	Cannot start the control	Power reset. Replace Controller if didn’t help
28	Bad Communication	Bad communication lines	See # 18-21

13.2.4 Fault Code for Indoor unit

Pressing Mode button for long will activate diagnostic mode by the acknowledgment of 3 short beeps and lighting of COOL and HEAT LED's.
Entering diagnostics in STBY mode allows only viewing of status (fault-display).
In diagnostic mode, system problems / information will be indicated by blinking of Heat & Cool LED's.
The coding method will be as follows:
Heat led will blink 5 times in 5 seconds, and then will be shut off for the next 5 seconds. Cool Led will blink during the same 5 seconds according to the following table:

No	Fault Name	5	4	3	2	1
1	RT-1 is disconnected	0	0	0	0	1
2	RT-1 is shorted	0	0	0	1	0
3	RT-2 is disconnected	0	0	0	1	1
4	RT-2 is shorted	0	0	1	0	0
…	Reserved	0	0	1	0	1
7	Communication mismatch	0	0	1	1	1
8	No Communication	0	1	0	0	0
9	No Encoder	0	1	0	0	1
10	Reserved	0	1	0	1	0
11	Outdoor Unit Fault	0	1	0	1	1
…	Reserved					
17	Defrost protection	1	0	0	0	1
18	Deicing Protection	1	0	0	1	0
19	Outdoor Unit Protection	1	0	0	1	1
20	Indoor Coil HP Protection	1	0	1	0	0
21	Overflow Protection	1	0	1	0	1
…	Reserved					
24	EEPROM Not Updated	1	1	0	0	0
25	Bad EEPROM	1	1	0	0	1
26	Bad Communication	1	1	0	1	0
27	Using EEPROM data	1	1	0	1	1
28	Model A	1	1	1	0	0
29	Model B	1	1	1	0	1
30	Model C	1	1	1	1	0
31	Model D	1	1	1	1	1

1 - ON, 0 - OFF

Only one code is shown. Order of priority is lower to the higher number. Diagnostics is continuously ON as long power is on.

13.2.4.1 Indoor unit diagnostics and corrective actions

No.	Fault	Probable Cause	Corrective Action
1-4	Sensor failures	Sensors not connected or damaged	Check sensor connections or replace sensor
7	Communication mismatch	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
8	No Communication	Communication or grounding wiring is not good	Check Indoor to Outdoor wiring and grounding
9	No Encoder	Indoor electronics or motor	Check motor wiring, if ok, replace motor, if still not ok, replace Indoor controller.
11	Outdoor Unit Fault	Outdoor controller problem	Switch to Outdoor diagnostics.
17-21	Protections	Indication	No action
24	EEPROM Not Updated	System is using ROM parameters and not EEPROM parameters	No action, unless special parameters are required for unit operation.
25	Bad EEPROM		No action, unless special parameters are required for unit operation.
26	Bad Communication	Communication quality is low reliability	Check Indoor to Outdoor wiring and grounding
27	Using EEPROM data	No problem	
28-31	IDU model		

13.2.5 Procedures for checking Main Parts

13.2.5.1 Checking Mains Voltage

Confirm that the Mains voltage is between 198 and 264 VAC. If Mains voltage is out of this range, abnormal operation of the system is expected. If in range check the Power (Circuit) Breaker and look for broken or loosed cable lugs or wiring mistake(s).

13.2.5.2 Checking Main fuse

Check 20A fuse on the Filter Board - If burnt – check the compressor, fan or any other peripheral that can cause a short. In case of a problematic peripheral - replace it.
In case no problematic peripheral, check the resistance on the DC bank (B+ & B- on the Power board), if it is less than 30**Ω**, replace the controller. Otherwise replace the burnt fuse. In case of frequent burning fuse, replace the controller.

13.2.5.3 Checking PFC Chock coil

Check PFC chock connection – repair if needed.
Dis-connect the chock from the controller wire extensions, check if the 2 wires of the chock are shorted. If shorted (OK) check between each wire and the metal box. If shorted replace chock, if not (OK), open the controller top cover and check if the wire extensions are connected well and if shorted. If not shorted, replace wires, if shorted (OK) than might be a controller problem – replace controller.

13.2.5.4 Checking the Outdoor Fan Motor

Check FAN-Power and FAN-Halls connections - Repair if needed.
Rotate the fan slowly by hand. If the fan does not rotate easily, check whether something is obstructing the fan, or if the fan itself is coming into contact with the outer case, preventing it from rotating. Correct if necessary - otherwise, the fan motor bearings have seized. Replace the motor.
If the fan rotates easily, use a current probe ("Clamp") to assure AC current on each phase and it is less than 1A.
In case there is no current, check the resistance between the three poles. Assure the three coil resistances are almost the same.
The normal value should be between 10**Ω** to 20**Ω**.
Change to Stand-by or Power OFF and re-start - If the fault is still active - replace controller.

13.2.5.5 Checking the Compressor

Check Compressor connections - Repair if needed.
Use a current probe ("Clamp") to assure that there is an AC current on each phase – no more than 15A.
In case there is no current, check the resistance between the three poles. Assure the three coil resistances are almost the same (between 0.8**Ω** to 1.5**Ω**).
Change to Stand-by or Power OFF and re-start - If the fault is still "Active" - replace controller.

13.2.5.6 Checking the Reverse Valve (RV)

The RV has two parts, Solonoid and valve.
Solonoid - Running in heating mode, check the voltage between two pins of reverse valve connector, normal voltage is 230VAC. if no power supply to RV, Check RV operation with direct 230VAC power supply, if OK, replace outdoor controller.
Valve - if RV solonoid is OK (as above) but still no heating operation while compressor is On, replace the valve.

13.2.5.7 Checking the electrical expansion valve (EEV)

The EEV has two parts, drive and valve.
When Outdoor unit is powered on, EEV shall run and have click and vibration.
For assuring the problem is of the EEV parts, perform the installation test and if fails and no other indications in the diagnostics, than the problem is with the EEV (one or more).
Drive - a step motor; ringed on the valve. Check the drive voltage, should be12VDC.
Valve – if drive is OK (as above) but still the indoor unit perform no conditioning replace the valve (no need to take out the refrigerant, just pump down and shut off the main valves).

13.2.5.8 Checking the termistors

Check Thermistor connections and wiring - Repair if needed.
Check Thermistor resistance – between 0ºC and 40ºC should be between 35K**Ω** and 5K**Ω**.

13.2.5.9 Checking the communication

Change to Stand-by or Power OFF and re-start - If the fault is still "Active" check Indoor to Outdoor. Communication wiring and grounding connections (should be less than 2.0**Ω**) - Repair if needed.
If IDU failure – replace IDU controller that does not respond.
If ODU failure – replace ODU.

13.2.5.10 Checking for electromagnetic interferance (EMC problems)

EMC troubles to the A/C unit

Locations most susceptible to noise :

1. Locations near broadcast stations where there are strong electromagnetic waves.
2. Locations near amateur radio (short wave) stations.
3. Locations near electronic sewing machines and arc-welding machines.

Trouble :

Either of the following trouble may occur:

1. The unit may stop suddenly during operation.
2. Indicator lamps may flicker

Correction :

The fundamental concept is to make the system less susceptible to noise (insulate for noise or distance from the noise source):

1. Use shielded wires.
2. Move unit away from the noise source.

13.2.5.11 EMC troubles to near by home appliances

Locations most susceptible to noise :

1. A television or radio is located near the A/C and A/C wiring.
2. The antenna cable for a television or radio is located close to the A/C and A/C wiring.
3. Locations where television and radio signals are weak.

Trouble :

1. Noise appears in the television picture, or the picture is distorted.
2. Static occurs in the radio sound.

Correction

1. Select a separate power source.
2. Keep the A/C and A/C wiring at least 1 meter away from wireless devices and antenna cables.
3. Change the wireless device's antenna to a high sensitivity antenna.
4. Change the antenna cable to a BS coaxial cable.
5. Use a noise filter (for the wireless device).
6. Use a signal booster.

13.2.6 Precaution, Advise and Notice Items

13.2.6.1 High voltage in Outdoor unit controller

Whole controller, including the wires, connected to the Outdoor unit controller may have the potential hazard voltage when power is on. Touching the Outdoor unit controller may cause an electrical shock.

Advise: Don't touch the naked lead wire and don't insert finger, conductor or anything else into the controller when power is on.

13.2.6.2 Charged Capacitors

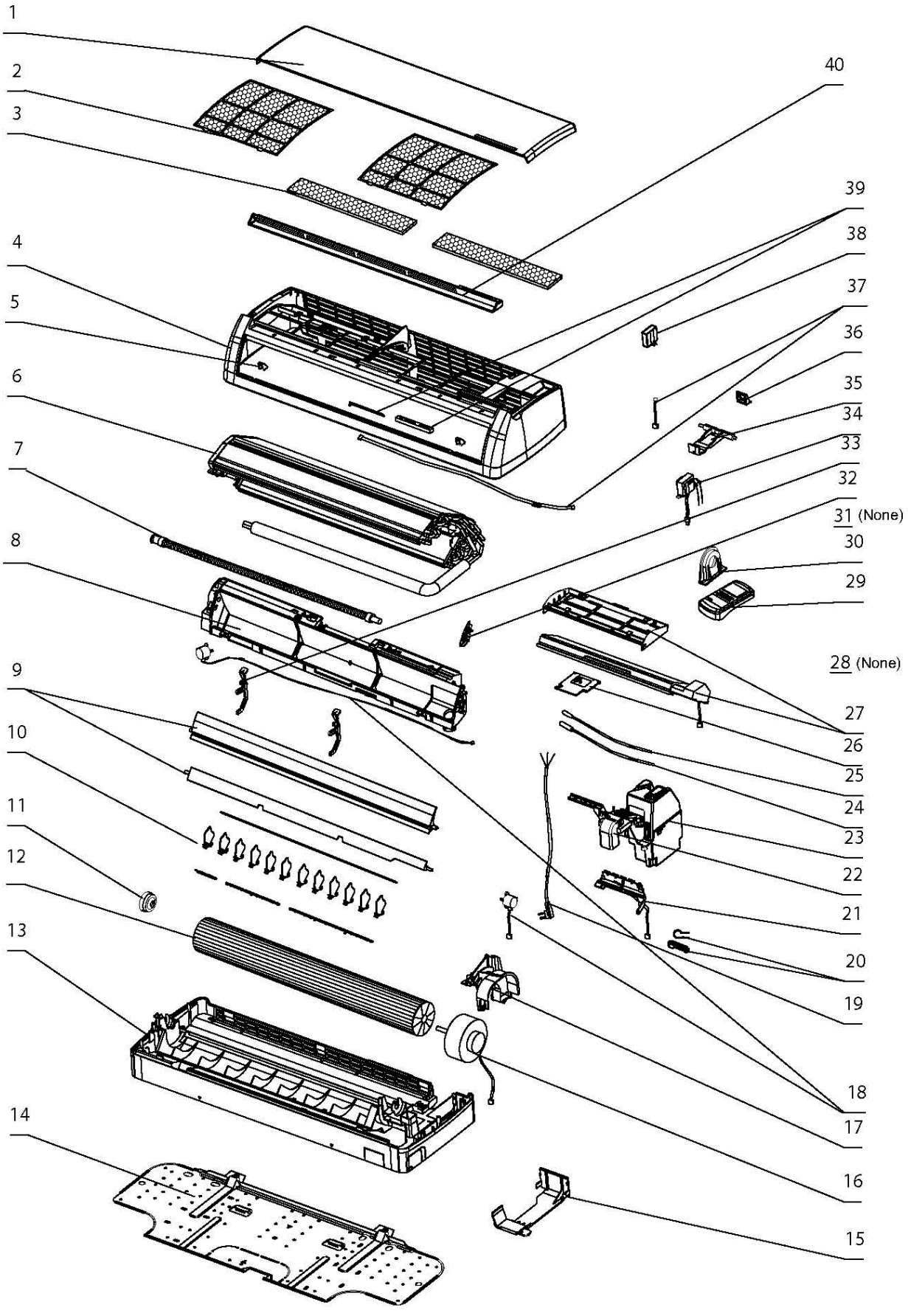
Three large-capacity electrolytic capacitors are used in the Outdoor unit controller. Therefore, charging voltage (380VDC) remains after power down. Discharging takes about one minute after turned off. Touching the Outdoor unit controller before discharging may cause an electrical shock. When open the Outdoor unit controller cover, don't touch the soldering pin by hand or by any conductive material.

13.2.6.3 Advise:

Open the Outdoor unit controller cover only after one minute from power off.
Measure the electrolytic capacitors voltage before farther checking controller.
Additional advises
When disassemble the controller or the front panel, turn off the power supply.
When connecting or disconnecting the connectors on the PCB, hold the whole housing, don't pull the wire, there are sharp fringes and sting on shell. Use gloves when disassemble the A/C units.

14. EXPLODED VIEWS AND SPARE PARTS LISTS

14.1 Indoor Unit: PNX 9 / 12 DCI



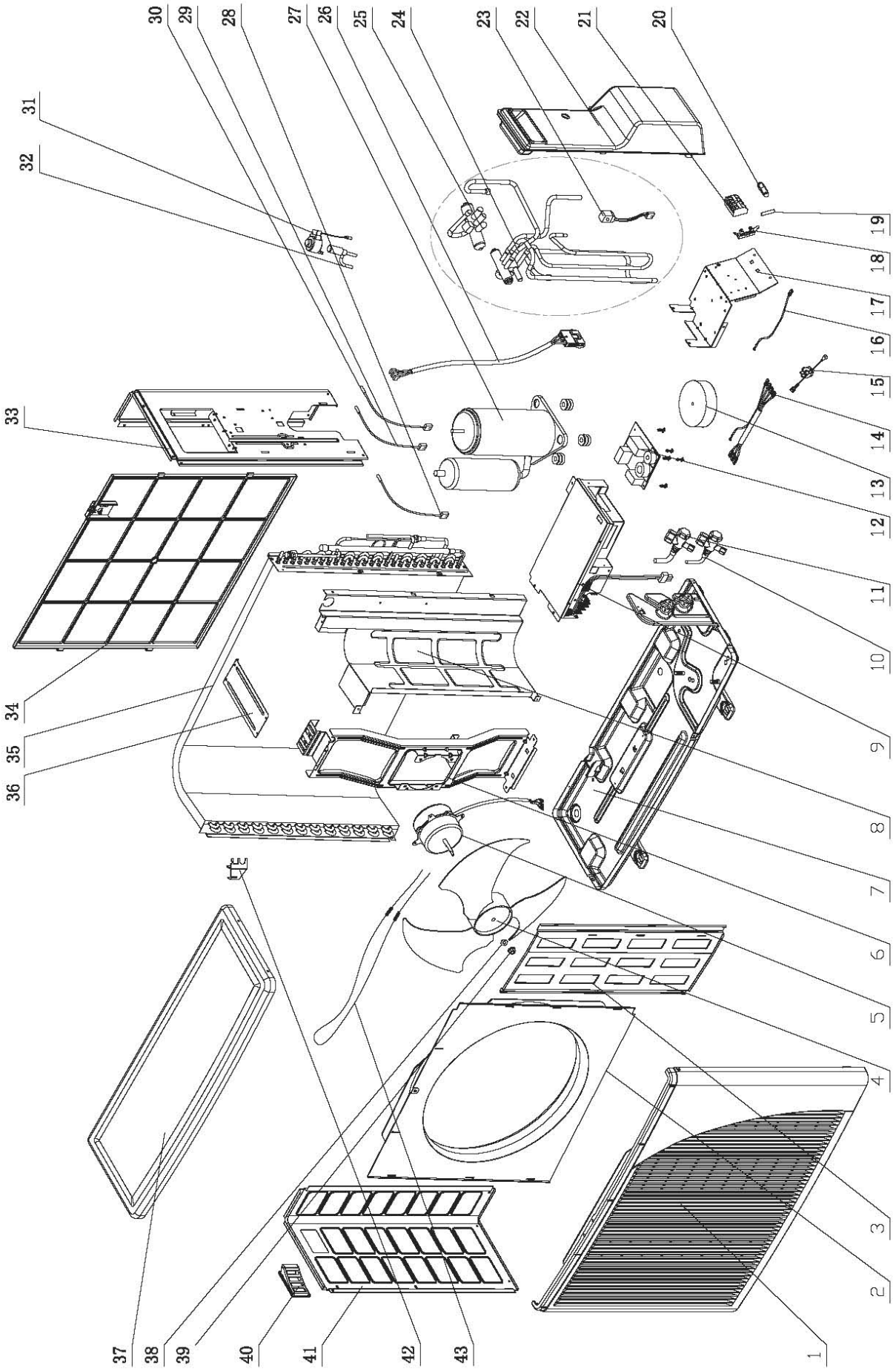
14.2 Indoor Unit: PNX 9 DCI

No.	PN	Description	Quantity
1	465800016	A Grill A Assy./ Electra PNX 7/9/12/14	1
2	4518655	Air filter	2
3	4519132	ACTIVE CARBON FILTER ASSY	1
4	4519744	Low temperature catalys	1
5	465720059	Front Frame Assy./ PNX7/9/12/14	1
6	4526952	Screw Cover	2
7	4526389	R410A EVAPORATOR ASSY HPI DC	1
8	4518664	Drain hose	1
9	4527434	Air Outlet Assy	1
10	4518638	Upper Louver	1
11	4526953	Lower Louver	1
12	4518640	Vert. Louver A	2
13	4518641	Vert. Louver B	10
14	4518662	Bearing assy fan	1
15	4518661	Fan assy plastic D91	1
16	4518730	Rear panel assy	1
17	4518670	Installation Plate	1
18	4518654	TUBE BRACKET	1
19	4519864R	PG 20W PG Motor	1
20	4518650	Motor Cover	1
21	452969400	Step Motor A	1
22	452969500	Step Motor B	1
23	455013705R	PowerCordWithoutPlug/3G/1.5/2100()	1
24	4519147	Power Cord Clip	1
25	467300079R	DisplayBoardAssy./PNX25/35DCIWithnewfunc	1
26	4518666	Sensor Braket	1
27	467300067R	PNX DCI Indoor Controller With Vertical	1
28	438082	Thermistor Indoor	1
29	467400024	Indoor Air Inlet Temperature 320mm	1
30	465340012	Terminal Cover	1
31	4518663	ELECTROSTATIC FLITER WNG-1	1
32	467200004R	RC-3I-1 KUMANDA	1
33	4518651	Cover Side Motor	1
34	4518682	Gear BOX ASSY	1
34	452867800R	Transformer/WNG DCI	1
35	4518646	LOUVER SUPPORT	1
37	4518657	TUBE LOCK	1
38	4518656	MOUNTING HOOK	2
39	4519900	IONIZER CABLE A	1
40	467430000	Power Supply Unit /Ionizer	1
41	467480001	Ionizer/WNG NWNG SERIES	1
42	465160004	A Air Inlet Frame A	1

14.3 Indoor Unit: PNX 12 DCI

No.	PN	Description	Quantity
1	465100027	A Grill A Assy./Airwell PNX 9 35 DCI R4	1
2	4518655	Air filter	2
3	4519132	ACTIVE CARBON FILTER ASSY	1
4	465720059	Front Frame Assy./ PNX7/9/12/14	1
5	4526952	Screw Cover	2
6	4526389	R410A EVAPORATOR ASSY HPI DC	1
7	4527434	Air Outlet Assy	1
8	4522754	DRAIN WATER TUBE	1
9	4518638	Upper Louver	1
9	4526953	Lower Louver	1
10	4518640	Vert. Louver A	2
10	4518641	Vert. Louver B	10
11	4518662	Bearing assy fan	1
12	4518661	Fan assy plastic D91	1
13	465700000	Unit Housing Assy./PNX	1
14	4518670	Installation Plate	1
15	4518654	TUBE BRACKET	1
16	4519864R	PG 20W PG Motor	1
17	4518650	Motor Cover	1
18	452969400	Step Motor A	1
20	4519147	Power Cord Clip	1
21	467300054R	Display Board /PNX for EHK MCU(Without	1
22	4518666	Sensor Braket	1
23	467300067R	PNX DCI Indoor Controller With Vertical	1
24	438082	Thermistor Indoor	1
25	467400024	Indoor Air Inlet Temperature 320mm	1
26	465340012	Terminal Cover	1
29	4527178R	RC 7	1
30	4518651	Cover Side Motor	1
31	4518682	Gear BOX ASSY	1
34	4518646	LOUVER SUPPORT	2
35	452867800R	Transformer/WNG DCI	1
36	4518657	TUBE LOCK	1
37	4518656	MOUNTING HOOK	2
41	465800018	Air Inlet Frame A Assy./ PNX	1
42	465340013	Cover/Front Frame/Replace	1

14.4 Outdoor Unit: GC 9 / 12 DCI

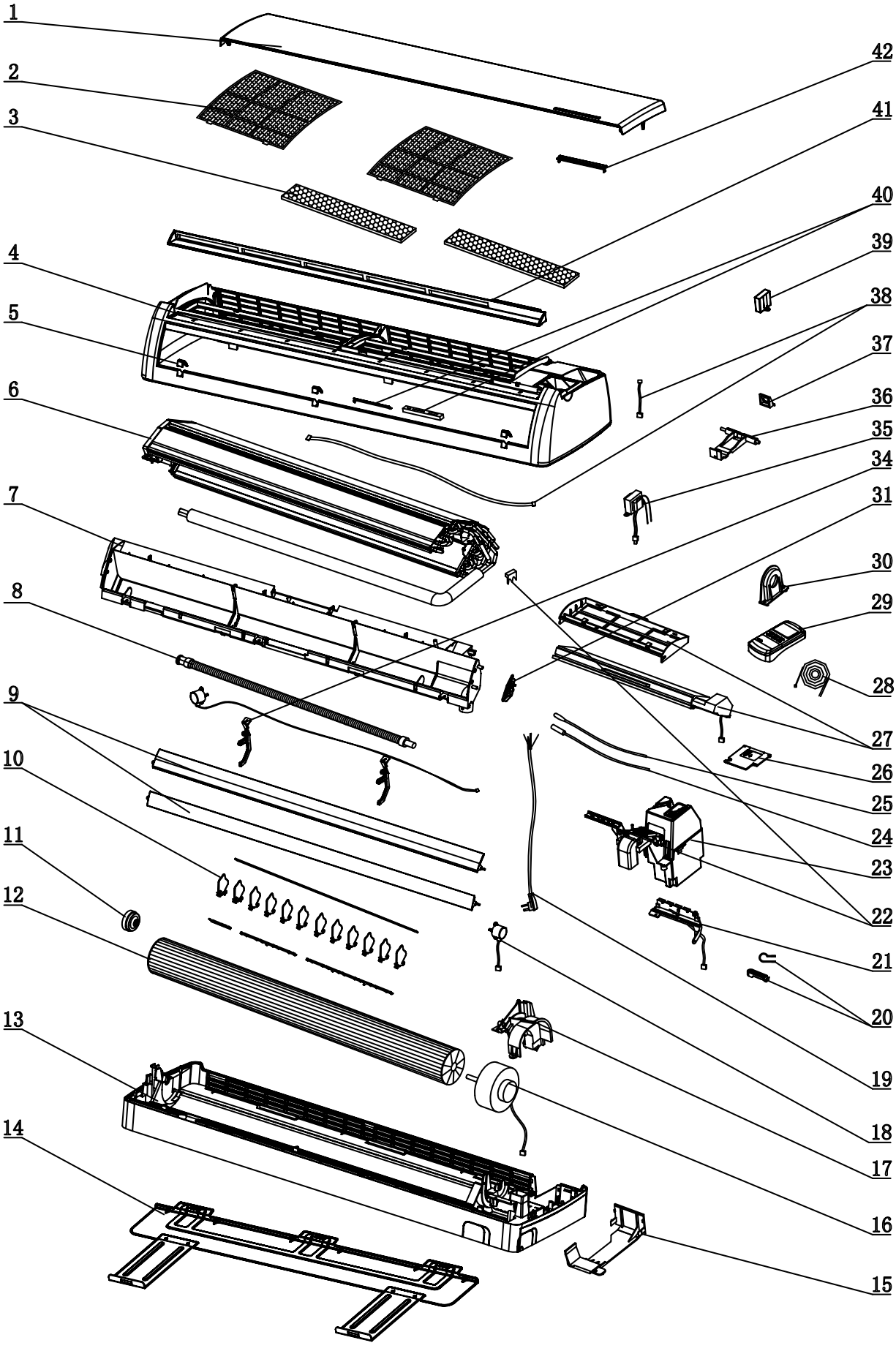


CONTENTS

14.5 Outdoor Unit: GC 9 / 12 DCI

No.	Part No.	Description	Qty
1	433218	Front panel A	1
2	4526340	Air inlet ring-420	1
3	433223	Painting insulation plate	1
4	4526476	Axial fan OD=401	1
5	452889600	DC motor for GC9DCI/35	1
6	433215	Motor support	1
7	4523060	Base painting Assy.	1
	464600016	Base plate painting Assy.(for Nordic market)	1
8	4526299	Partition	1
9	4526403	Outdoor DC inverter controller (English)	1
10	4524177	Gas valve (R410A)	1
11	4524176	Liquid valve(R410A)	1
12	4526224	EMI fliter board 901-098-00	1
13	4526396	Chock Assy. 167-021-01	1
14	4526223	AC-IN connected wire	1
15	4526968	Earthing wire for DCI	1
16	4526222	Fuse connecting wire	1
17	4526300	Therminal sheet	1
18	4526220	Fuse stand JEF-511B(EHK P/N:150-038-00)	1
19	4526219	Fuse 65TS(15A,230)150-031-00	1
20	204107	Cable clip nylon	1
21	4519188	4 poles terminal block	1
22	433229	Value cover	1
23	4522509	4-Way valve coil	1
24	4526367	4-way valve welding Assy. (GC9DCI)	1
	4526393	4-way valve welding Assy. (GC12DCI)	1
25	4518951	4-way valve (GC9DCI)	1
	4518952	4-way valve (GC12DCI)	1
26	4526221	Compressor wire	1
27	4526204	DC Inverter compressor Assy. 5RS102XAB	1
28	4526775	Compressor top thermistor(CTT)	1
29	4526774	Outside air thermistor(OAT)	1
	453238900	Sensor /OAT (for Nordic market)	1
30	4526776	Outside coil thermistor(OCT)	1
31	4526828	EEV Coil (CAN-MD 12FKS-1 White)	1
32	4526827	Electronic expansion value (CAMB20YGFKS-1)	1
33	4519606	Right side panel	1
34	433228	Back side net	1
	464800002	Guard net painting assy. (for Nordic market)	1
35	4526368	Condenser soldering assy	1
36	4526298	Bridge	1
37	4519614	Painting top cover	1
38	4526480	Gasket for axial fan	1
39	4519300	Nut M5 L	1
40	433225	Handle	1
41	4519607	Left side panel painting plate	1
42	453225500	Support/ OAT 7" (for Nordic market)	1
43	467100004	Heater/Base plate (for Nordic market)	1

14.6 Indoor Unit: PNX 18 / 21 / 24 DCI



CONTENTS

14.7 Indoor Unit: PNX 18 DCI

No.	PN	Description	Quantity
1	465720126	ASilk-ScreenGrillAAssy./PNX50/60/72AIRWE	1
1	465720136	ASilk-ScreenGrillAAssy./PNX50/60/72Electra	1
2	452919800	Filter	2
3	4518113	AIR FILTER ASSY	1
4	465020046	Front Frame/PNX-18	1
5	465340035	Screw Cover/PNX-18	3
6	453134600	Evaporator Assy.	1
7	452917300	Air outlet	1
8	4518664	Drain hose	1
9	452917500	Horizontal flap A	1
9	452917600	Horizontal flap B	1
10	452930700	Vertical flap A	12
10	452918200	Vertical flap B	2
11	4518662	Bearing assy fan	1
12	453024900	Impeller fan	1
13	453053800	Base assy./WNG18	1
14	452920100	Mount bracket/WNG-18	1
15	452919400	Joint/Unit housing	1
16	453024500R	PG PG Motor	1
17	452918800	Cover/motor	1
18	453050200	STEP MOTOR A	1
18	453050300	STEP MOTOR B	1
20	4519147	Power Cord Clip	1
21	467300068R	Display Board /PNX 25/35	1
22	452919100	Support/sensor	1
22	4516263	SENSOR BASE	1
23	453030600R	WNG Indoor DC Inverter Controller	1
24	438082	Thermistor Indoor	1
25	467400025	Indoor Air Inlet Temperature 650mm	1
26	465340036	Terminal Cover/PNX-18	1
27	4524963	Electrostatic Filter	1
29	467240005	Remote controller Assy with batteries	1
30	4518651	Cover Side Motor	1
31	453057900	Gear BOX ASSY	1
34	452918700	Support/horizontal louver	2
36	4518657	TUBE LOCK	1
38	4524967	IONIZER WIRE A	1
38	453109300	Wire UL100726AWG/Ionizer	1
39	467430000	Power Supply Unit /Ionizer	1
40	467480001	Ionizer/WNG NWNG SERIES	1
41	465160008	A Air Inlet Frame A/PNX-18	1

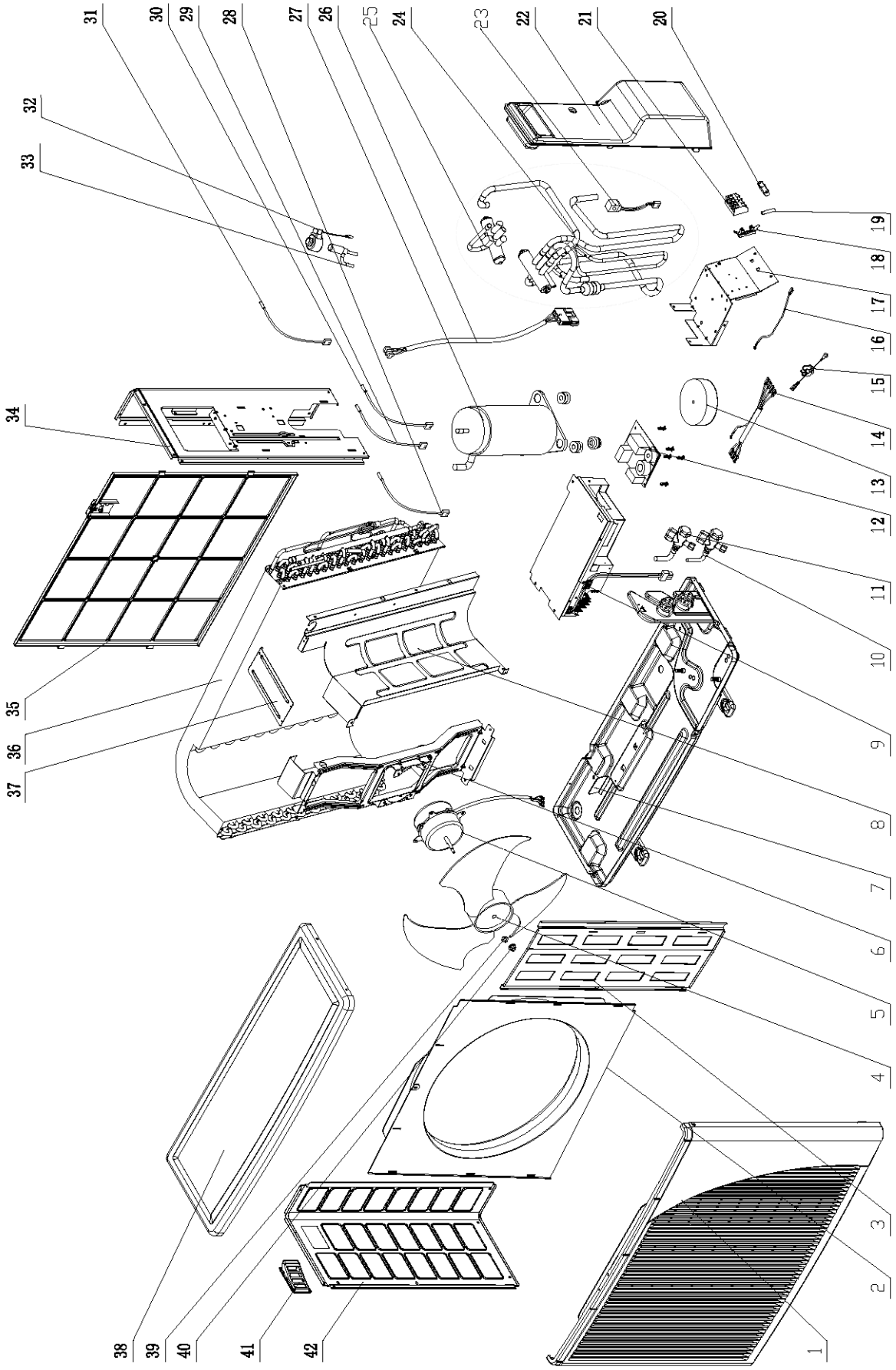
14.8 Indoor Unit: PNX 21 DCI

No.	PN	Description	Quantity
1	465720126	ASilk-ScreenGrillAAssy./PNX50/60/72AIRWEL	1
1	465720136	ASilk-ScreenGrillAAssy./PNX50/60/72Electra	1
2	452919800	Filter	2
3	4518113	AIR FILTER ASSY	1
4	465020046	Front Frame/PNX-18	1
5	465340035	Screw Cover/PNX-18	3
6	453134600	Evaporator Assy.	1
7	452917300	Air outlet	1
8	4518664	Drain hose	1
9	452917500	Horizontal flap A	1
9	452917600	Horizontal flap B	1
10	452930700	Vertical flap A	12
10	452918200	Vertical flap B	2
11	4518662	Bearing assy fan	1
12	453024900	Impeller fan	1
13	453053800	Base assy./WNG18	1
14	452920100	Mount bracket/WNG-18	1
15	452919400	Joint/Unit housing	1
16	453024500R	PG PG Motor	1
17	452918800	Cover/motor	1
18	453050200	STEP MOTOR A	1
18	453050300	STEP MOTOR B	1
20	4519147	Power Cord Clip	1
21	467300068R	Display Board /PNX 25/35 (With New Funti	1
22	452919100	Support/sensor	1
22	4516263	SENSOR BASE	1
23	453030600R	WNG Indoor DC Inverter Controller(ENGLIS	1
24	438082	Thermistor Indoor	1
25	467400025	Indoor Air Inlet Temperature 650mm	1
26	465340036	Terminal Cover/PNX-18	1
27	4524963	Electrostatic Filter	1
29	467240006	Remote controller Assy with batteries.	1
30	4518651	Cover Side Motor	1
31	453057900	Gear BOX ASSY	1
34	452918700	Support/horizontal louver	2
36	4518657	TUBE LOCK	1
38	4524967	IONIZER WIRE A	1
38	453109300	Wire UL100726AWG/Ionizer	1
39	467430000	Power Supply Unit /Ionizer	1
40	467480001	Ionizer/WNG NWNG SERIES	1
41	465160008	A Air Inlet Frame A/PNX-18	1

14.9 Indoor Unit: PNX 24 DCI

No.	PN	Description	Quantity
1	465720126	ASilk-ScreenGrillAAssy./PNX50/60/72AIRWE	1
1	465720136	ASilk-ScreenGrillAAssy./PNX50/60/72Electra	1
2	452919800	Filter	2
3	4518113	AIR FILTER ASSY	1
4	465020046	Front Frame/PNX-18	1
5	465340035	Screw Cover/PNX-18	3
6	453260400	Evaporator Assy/WNG24	1
7	452917300	Air outlet	1
8	4518664	Drain hose	1
9	452917500	Horizontal flap A	1
9	452917600	Horizontal flap B	1
10	452930700	Vertical flap A	12
10	452918200	Vertical flap B	2
11	4518662	Bearing assy fan	1
12	453024900	Impeller fan	1
13	453053800	Base assy./WNG18	1
14	452920100	Mount bracket/WNG-18	1
15	452919400	Joint/Unit housing	1
16	453206800R	DC Motor 25W/(DR-8938-538D)	1
17	452918800	Cover/motor	1
18	453050200	STEP MOTOR A	1
18	453050300	STEP MOTOR B	1
20	4519147	Power Cord Clip	1
21	467300068R	Display Board /PNX 25/35 (With New Funti	1
22	452919100	Support/sensor	1
22	4516263	SENSOR BASE	1
23	453207000R	Controller Assy./WNG72 INV	1
24	438082	Thermistor Indoor	1
25	467400025	Indoor Air Inlet Temperature 650mm	1
26	465340036	Terminal Cover/PNX-18	1
27	4524963	Electrostatic Filter	1
29	467240006	Remote controller Assy with batteries.	1
30	4518651	Cover Side Motor	1
31	453057900	Gear BOX ASSY	1
34	452918700	Support/horizontal louver	2
36	4518657	TUBE LOCK	1
38	4524967	IONIZER WIRE A	1
38	453109300	Wire UL100726AWG/Ionizer	1
39	467430000	Power Supply Unit /Ionizer	1
40	467480001	Ionizer/WNG NWNG SERIES	1
41	465160008	A Air Inlet Frame A/PNX-18	1

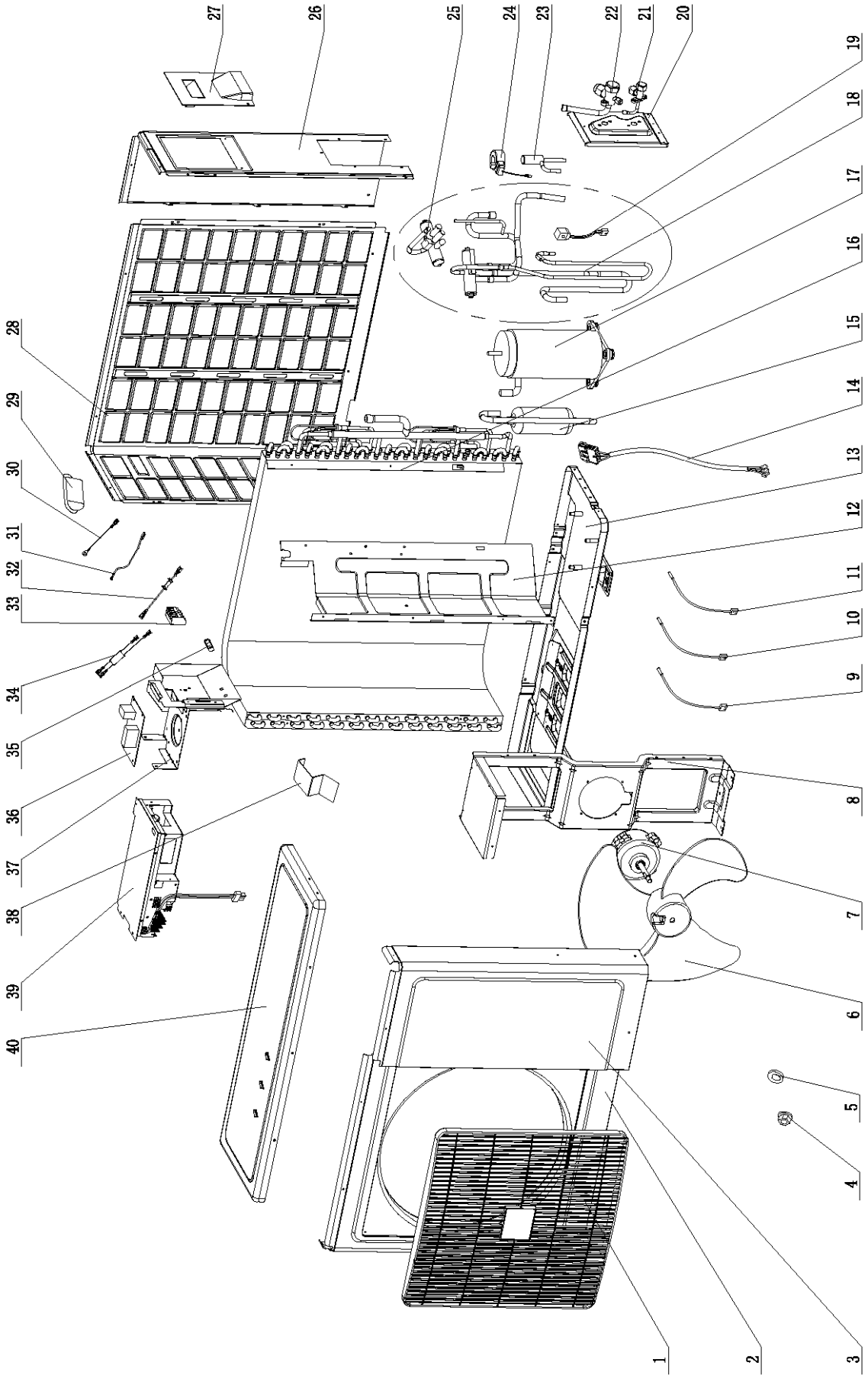
14.10 Outdoor Unit: GC 18 DCI



14.11 Outdoor Unit: GC 18 DCI

ItemNo.	Part No.	Description	Qty
1	433218	Front panel A	1
2	4526340	Air inlet ring-420	1
3	433223	Painting insulation plate	1
4	4526476	Axial fan OD=401	1
5	4526475	DC motor for GC 18 DCI	1
6	4526457	Motor support	1
7	4527363	Base painting Assy.	1
8	4526459	Partition	1
9	4526203	Outdoor DC inverter controller (English)	1
10	4524595	Gas valve (R410A)	1
11	4524176	Liquid valve (R410A)	1
12	4526224	EMI fliter board 901-098-00	1
13	4526396	Chock Assy. 167-021-01	1
14	4526223	AC-IN connected wire	1
14	4526968	Earthing wire for DCI	1
16	4526222	Fuse connecting wire	1
17	4526300	Therminal sheet	1
18	4526220	Fuse stand JEF-511B(EHK P/N:140-038-00)	1
19	4526533	Fuse 65TS(20A,230)140-031-00	1
20	204107	Cable clip nylon	1
21	4519188	4 poles terminal block	1
22	433229	Value cover	1
23	4522509	4-Way valve coil	1
24	4527327	4-way valve welding Assy.	1
25	4518952	4-way valve	1
26	4526221	Compressor wire	1
27	4523446	DC Inverter compressor Assy. 5CS130XCC03	1
28	4526775	Compressor top thermistor(CTT)	1
29	4526774	Outside air thermistor(OAT)	1
30	4526776	Outside coil thermistor(OCT)	1
31	4526969	Suction coil thermistor(SUCT)	1
32	4526214	Electronic expansion valve ZDPF(L)-1.6C-01-RK forR410A	1
33	4526216	EEV COIL QA(L)12-HR-01A-RK	1
34	4519606	Right side panel	1
35	433228	Back side net	1
36	4526459	Condenser soldering assy	1
37	4526298	Bridge	1
38	4519614	Painting top cover	1
39	4526480	Gasket for axial fan	1
40	4519300	Nut M5 L	1
41	433225	Handle	1
42	4519607	Left side panel painting plate	1

14.12 Outdoor Unit: GC 21 DCI

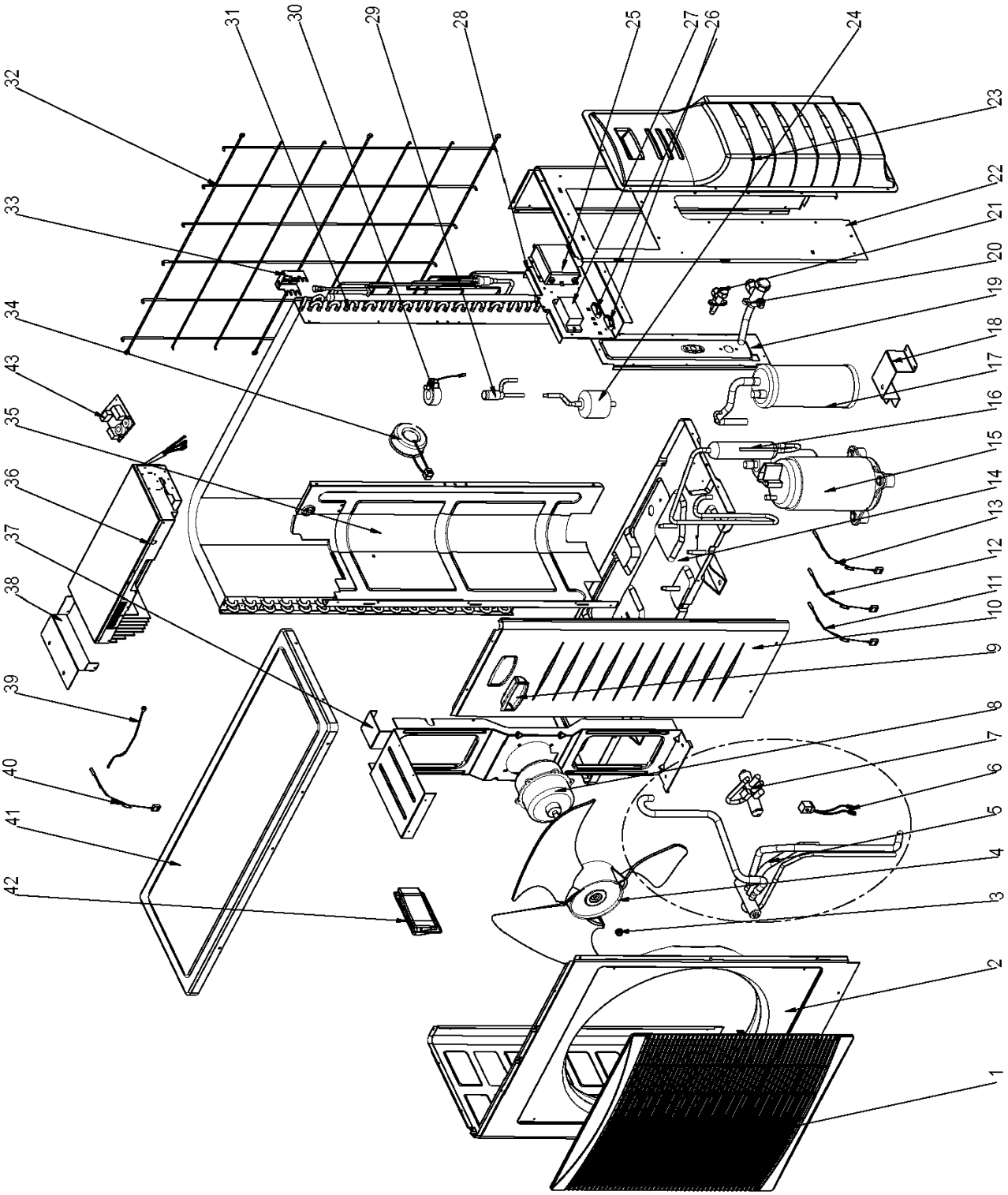


CONTENTS

14.13 Outdoor Unit: GC 21 DCI

Item No.	Part No.	Description	Qty
1	4517144	FAN COVER PP+UV	1
2	452795700	PAINTED LEFT CABINET ASSY	1
3	4521642	Painted Right Cabinet and Isolation Assy.	1
4	4523141	M10 Hexagon locked nut M10	1
5	4526841	cusion for fan	1
6	4526510	FAN D=460mm (3 blade)	1
7	453026500	DC Motor SIC-71FW-F170-2	1
8	453036400	Motor Support	1
9	453238900	Sensor/OAT	1
10	4526775	Compressor top thermistor(CTT)	1
11	4526776	Outdoor coil thermistor(OCT)	1
12	453035800	Partition Plate	1
13	453036100	Base Plate Paint Assy.	1
14	4526221	Compressor wire	1
14	453041900	Liquid Accumulator	1
16	452882900	Condenser and distributor welding assy.	1
17	4523446	Scroll DC compressor assy. 5CS130XCC03	1
18	453034000	4-way Valve System Assy.	1
19	4522509	4-Way valve coil	1
20	4516766	PAINTED VALVE PLATE ASSY	1
21	4526301	High pressure stop valve R410a	1
22	4524595	1/2” Gas Valve for ONG R410A	1
23	4526214	Electronic expansion valve ZDPF(L)-1.6C-01-RK for R410A	1
24	4526216	EEV COIL QA(L)12-MD-02	1
25	4518952	4-W valve SHF-7H for R410A	1
26	4525938	PAINTED RIGHT-BACK CABINET ASSY	1
27	4523145	R.lifter	1
28	4517028	PAINTED LEFT-BACK GRILL	1
29	4516758	SMALL HANDLE	1
30	452841100	Earth wire	3
31	453238800	Ground Wire	1
32	453238700	Wire UL1007 16AWG/COM	1
33	4519188	4 poles terminal block	1
34	453238600	Wire 1014 16#/Power Input	1
35	204107	Cable clip Nylon	1
36	453048500	DCI 2.8kW EMI Filter Board 901-107-00	1
37	453052900	Therminal Plate Assy.	1
38	4526585	connect for motor backet	1
39	453030500	Outdoor DCI Controller/2.8kW(English) 906-105-00	1
40	4516788	PAINTED TOP COVER ASSY	1

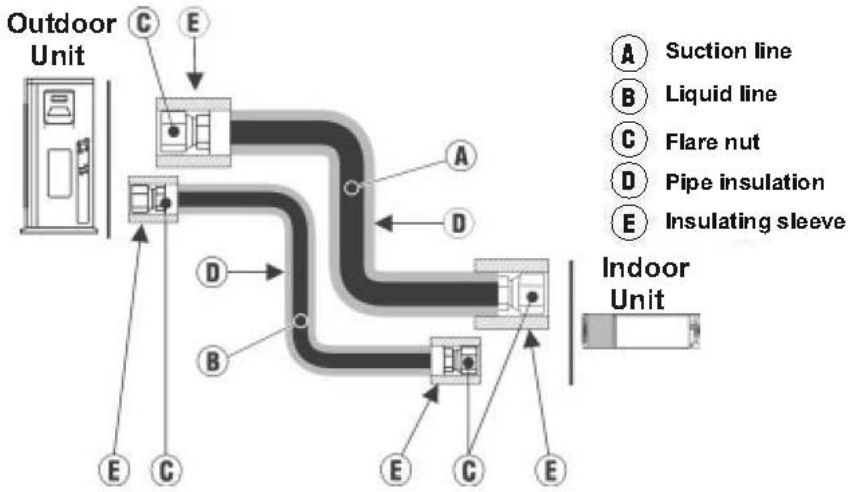
14.14 Outdoor Unit: GC 24 Z DCI

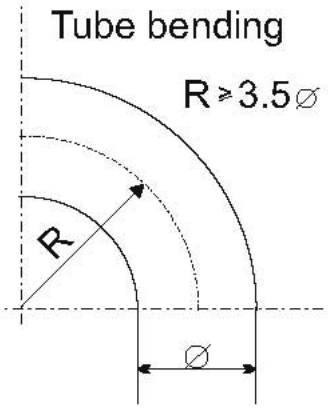


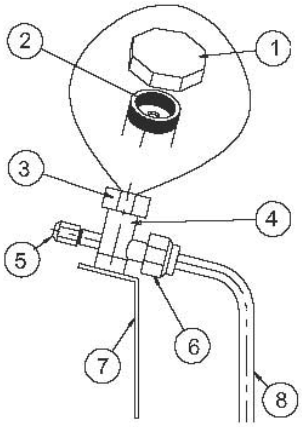
14.15 Outdoor Unit: GC 24 Z DCI

No.	Item	Description	Quan.
1	465100000	Grill/ DCI Trio	1
2	4523652	PAINTED LEFT CABINET ASSY	1
3	4523758	Nut M8 left	1
4	452960400	Outdoor Fan	1
5	461600023	4-Way Valve Assy.	1
6	4522509	4-way Valve Coil	1
7	4526522	FOUR-WAY VALVE R410A	1
8	466130002R	DC Motor 70W 8P	1
9	4522601	Right Handle	1
10	4523653	PAINTED RIGHT CABINET ASSY	1
11	4526775	Compressor Top Thermistor(CTT)	1
12	452956500	OMT Thermistor(OMT)	1
13	452677601	Outdoor Coil Thermistor(OCT)	1
14	452809900	Base Plate Painting Assy.	1
15	460080000R	Compressor Assy./ C-7RVN153H0W SANYO ShenYang)	1
16	452783600	Oil Separator Assy.	1
17	452783200	Liquid-gas Separator	1
18	453256100	Support Painting Support Assy./Gas-Liquid Separator	1
19	4526080	Valve plate paint assy	1
20	4526513	LOW PRESS VALVE (R410A)	1
21	4526514	Hight press valve(R410A)	1
22	4523654	PAINTED RIGHT BACK CABINET ASSY	1
23	4522602	Valve Cover	1
24	4518950	Filter Drier BFK-053S	1
26	204107	Cable clip Nylon	2
27	467420003	7 Poles Terminal Block	1
28	464280001	Terminal Plate/ DCI 72Z	1
29	4526215	Electronic expansion valve ZDPF(L)-1.6C-01-RK for R410A	1
30	4526216	EEV COIL QA(L)12-MD-02	1
31	462300002	Condenser Assy.	1
32	453175500	Guard Net Painting Assy.	1
33	453083800	Support/OAT	1
34	4526396	Choke Assy.167-021-01	1
35	464730006	Partition Plate Assy./DCI 72Z	1
36	467300082R	Controller/Outdoor Unit DCI 3.0KW(English) 906A-361-00	1
37	452888500	Motor Support	1
38	464250044	Connect Plate/Controller DCI 72Z	1
39	452841100	Earth wire	3
39	4516540	Earth wire	2
40	453238900	Sensor/OAT	1
41	4523657	PAINTED TOP COVER ASSY	1
42	4522600	Left Handle	1
43	467300114R	DCI 3.0KW EMI Fillter Board 901A-574-00	1

15. TUBING CONNECTIONS







TUBE (Inch) / TORQUE (Nm)	1/4"	3/8"	1/2"	5/8"	3/4"
Flare Nuts	11-13	40-45	60-65	70-75	80-85
Valve Cap	13-20	13-20	18-25	18-25	40-50
Service Port Cap	11-13	11-13	11-13	11-13	11-13

1. Valve Protection Cap-end
2. Refrigerant Valve Port (use Allen wrench to open/close)
3. Valve Protection Cap
4. Refrigerant Valve
5. Service Port Cap
6. Flare Nut
7. Unit Back Side
8. Copper Tube

When the outdoor unit is installed above the indoor unit an oil trap is required every 5m along the suction line at the lowest point of the riser. Incase the indoor unit is installed above the outdoor, no trap is required.

APPENDIX A

INSTALLATION AND OPERATION MANUALS